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ABSTRACT

Intended to assist Illinois educational personnel to provide vocational education services for students with physical disabilities, the handbook's eight sections focus on program and facility modification to accommodate physically disabled students in regular vocational education programs. Section I introduces the topic, provides an historical perspective, and describes the "Accessibility Decision Making" model. Section II describes specific disabling conditions: hearing and vision disabilities, disabilities of the nervous system, musculoskeletal disabilities, other health disabilities, and multiple disabilities. Section III, on assessment of the physically disabled student, considers teacher made assessment instruments and assessment by interview and observation. The next three sections offer specific guidelines and diagrams for accessibility to school buildings, vocational labs, and equipment. Section VII provides suggested techniques for teaching physically disabled students with hearing disabilities, visual disabilities, orthopedic disabilities, and consciousness disabilities (usually epilepsy and diabetes). The final section provides a listing of resources including materials in print; organizations; equipment suppliers; Illinois agencies (concerned with vocational education, special education, and rehabilitative services); and funding sources. Also included is a booklet containing a condensed version of the Accessibility Standards developed by the Capital Development Board under Public Act 79-978, "Facilities for the Handicapped Act". (DB)

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ACCESSIBILITY TO LABORATORIES AND EQUIPMENT
FOR THE PHYSICALLY HANDICAPPED

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A Handbook for Vocational
Education Personnel

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Section I

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INTRODUCTION TO ACCESSIBILITY

Introduction

The materials within this handbook are designed to assist educational personnel in providing a wider range of opportunities in vocational education for students with physical disabilities. This handbook includes eight sections that deal with aspects of program and facility modification to accommodate these students in regular vocational education programs. Because of the wide range of disabling conditions and the wide range of vocational education programs, this handbook does not claim to have "*all* of the answers." Rather, it is a guide for teachers and administrators in making programs accessible to the physically disabled.

Description of the Handbook

Information and resources about program and facility modification are included in the eight sections of this handbook. The first section (Section I) introduces the topic, provides a historical perspective, and describes the "Accessibility Decision-Making" models. The next two sections (Sections II and III) describe various disabling conditions and methods for assessing the abilities of physically impaired students. The next three sections (Sections IV, V, and VI) are concerned with accessibility to school buildings, vocational labs, and equipment. The last two sections (Sections VII and VIII) consider teaching techniques and resources to assist vocational teachers in programming for the physically disabled student.

The goal of this handbook is to be teacher-supportive in the area of accessible vocational education programming for the physically disabled.

The content is applicable to modifying occupationally oriented laboratory programs at junior high schools, high schools, area vocational centers community colleges, and universities. The materials and suggestions presented in this handbook should help in developing a mental attitude and physical environment that is conducive to preparing *all* students for work and lifelong learning.

Historical Perspective

There *never* has been a legitimate basis for denying individuals with physical disabilities the civil rights that are available to all other Americans. These civil rights include the opportunity to participate in "normal" employment, as well as recreational, social, educational, and political pursuits of their choosing. However, obstacles have been constructed in our environment (such as curbs, stairs, narrow doorways, etc.) that have restricted access and mobility for many disabled persons. Because these obstacles are often imbedded in the architectural design, they are commonly referred to as "architectural barriers." Architectural barriers are in many ways both the cause, and the result, of "attitudinal" barriers which tend to perpetuate the prevailing sterotypes of the disabled.

How frustrating it must be for a disabled individual to be denied participation in the mainstream of society because of the inaccessibility of buildings and facilities that were supposedly built for all people. Of course, the public often takes many things for granted, unknowingly and unintentionally denying the disabled their civil rights.

To overcome some of these problems, various actions have been taken to remove architectural barriers from existing buildings and facilities and to eliminate them in new construction. Federal laws, such as the Architectural Barriers Act of 1968 (PL 90-480), have been enacted to insure access for the handicapped to federal and federally financed buildings and facilities. Under

PL 90-480 the administrator of the General Services Administration was to determine the standards for compliance with this law. He selected the American National Standards Institute (ANSI) (1961) standard A117.1-1961, Specifications for Making Buildings and Facilities Accessible to, and Useable by, the Physically Handicapped, as the standard to be met. This federal law brought some changes, but it was somewhat ineffective because it lacked strong enforcement mechanisms.

The Architectural Barriers Act of 1968 was greatly strengthened in two subsequent laws, the Rehabilitation Act of 1973 (PL 93-112) and the amendments to that act in 1974 (PL 93-516). Section 502 of PL 93-112 established the Architectural and Transportation Barriers Compliance Board. The amendments in 1974 (PL 93-516) strengthened the authority of the Board and gave it the power to "conduct investigations, hold public hearings and issue such orders as it deems necessary to insure compliance" with the provisions of the Architectural Barriers Act of 1968.

Section 504 of PL 93-112, as amended in PL 93-516, mandated antidiscrimination against the handicapped. The assured civil rights for the handicapped could not be guaranteed without accessibility. Therefore, the rules and regulations for section 504 mandated accessibility, which meant the reduction and/or elimination of architectural barriers.

In addition to the federal mandates, each state has enacted laws regarding barrier-free access. The State of Illinois, for example, has recently revised, updated, and strengthened the mandated standards for handicapped accessibility. These new Illinois standards for access were developed by the Capital Development Board after extensive research, public hearings, consultation, etc. The access standards are printed in a document entitled, Accessibility Standards Illustrated. This document is an excellent reference and resource because it contains information about disabling conditions, corresponding codes for access, and it has pictures or drawings showing how to meet the codes. This standard became law in Illinois on January 1, 1980. (Copies of the Accessibility Standards Illustrated can be obtained for $3.00 each from the Capital Development Board in Springfield, Illinois).

However, once architectural accessibility to buildings is achieved, participation in vocational education programs is not guaranteed. Many pieces of equipment requisite to successful completion of a vocational course or program are not accessible to or usable by some physically disabled students. Educational furniture and equipment that has been designed for use by the non-disabled are often called "instructional barriers." Both architectural and instructional barriers must be identified and eliminated to assure access to vocational education for the physically disabled.

Description of the Accessibility Decision-Making Model

The Accessibility Decision-Making Model (figure 1) is presented to depict the logical sequence of steps necessary to make vocational education labs and equipment accessible to the physically handicapped. Because of the wide range of differences throughout Illinois in vocational programs, school physical plants, disabling conditions of students, etc., the model allows for transportability and application to various educational settings.

The following brief descriptions of each level of the model are intended to present a general overview. Other sections of the handbook provide more detailed information about the various levels of the model.

ACCESSIBILITY TO VOCATIONAL EDUCATION LABS & EQUIPMENT:
MODELS FOR DECISION-MAKING

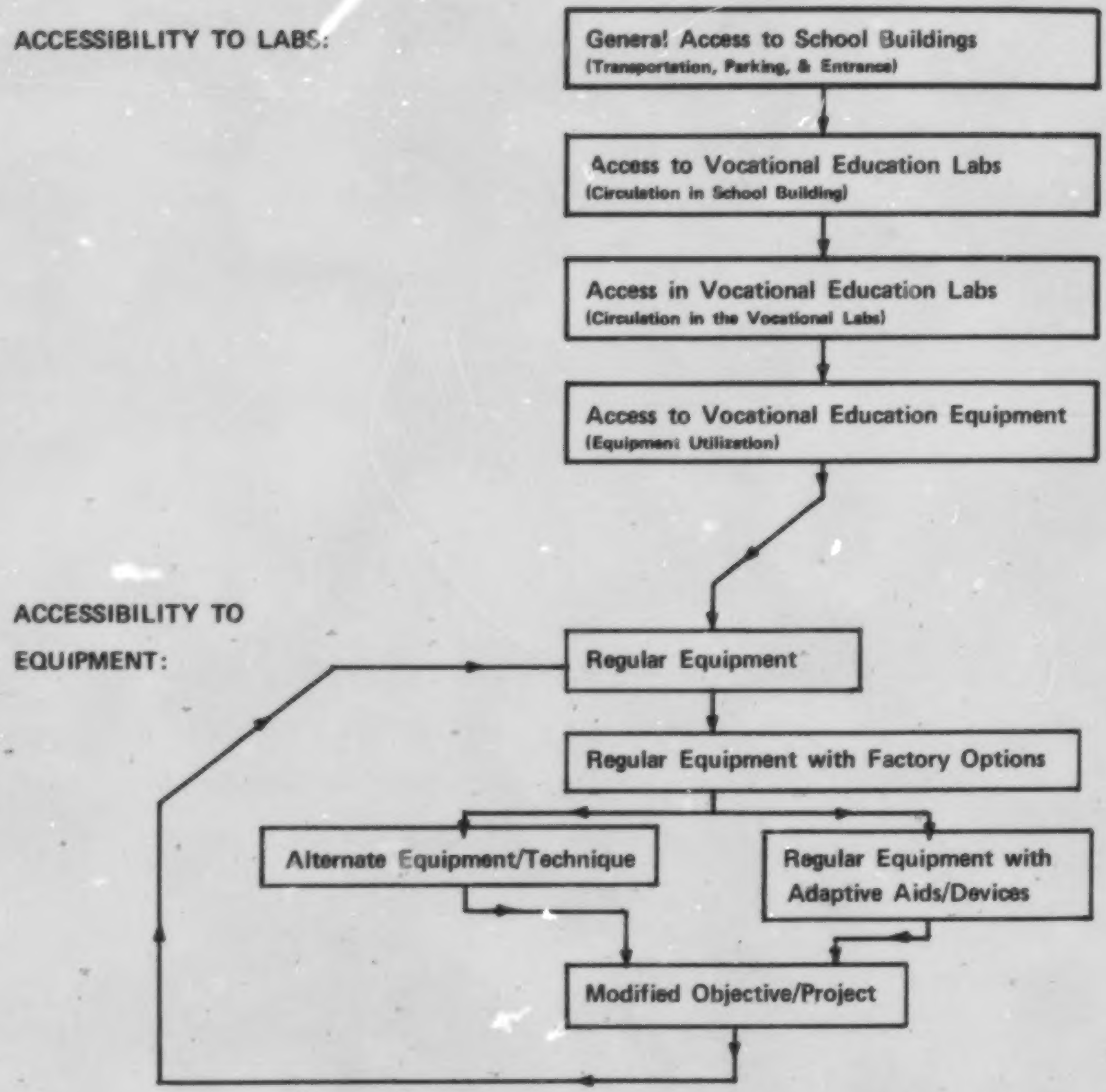
ACCESSIBILITY TO LABS:
General Access to School Buildings
(Transportation, Parking, & Entrance)
Access to Vocational Education Labs
(Circulation in School Building)
Access in Vocational Education Labs
(Circulation in the Vocational Labs)
Access to Vocational Education Equipment
(Equipment Utilization)
ACCESSIBILITY TO EQUIPMENT:
Regular Equipment
Regular Equipment with Factory Options
Alternate Equipment/Technique
Regular Equipment with Adaptive Aids/Devices
Modified Objective/Project

Figure I-1

General Access to School Buildings

The physically disabled student cannot have access to vocational education if he/she does not have access or entrance to the school building that houses vocational laboratories and the other related classrooms and facilities. Therefore, the first step in the Accessibility Model is to identify and eliminate barriers in transportation to school, parking, exterior walks and ramps, and exterior entrances. See section IV for detailed information about general access barriers and methods to identify and eliminate them.

Access to Vocational Education Labs

After the disabled student has access and entrance to the school buildings, the next consideration in the model is interior circulation. The question is "can the disabled student get to the vocational education laboratories?" Access in the school building to these labs, if they are on the second floor (or more likely in the basement), may require an elevator, a ramp, a chairlift, or some other procedure for mobility. Other related concerns for interior circulation include accessible lavatories, drinking fountains, cafeterias, auditoriums, etc. See section IV for detailed information about interior circulation barriers and methods of identifying and eliminating them.

Access in Vocational Education Laboratories

After providing the disabled student with access to the vocational lab, the next consideration is entrance to and access *within* the lab. To gain entrance, the doorway must have a 32" minimum clear opening for wheelchairs. Once inside the lab, several factors such as aisle width, accessible work stations, visual and sound warning devices (i.e., fire alarms), accessible lockers, etc. must be considered. The placement of desks, tables, and/or equipment, is critical for access in many instances. "Safe aisles" must allow mobility for visually impaired students and need to be wide enough to allow for wheelchairs. See section V for detailed information about lab layout to eliminate these barriers.

Access to Vocational Education Equipment

Once the disabled student has gained entrance to the lab and mobility throughout it, the next consideration is laboratory equipment. The model for access to equipment is depicted graphically in the lower part of figure 1. It starts by having the disabled student use the regular equipment in the lab. Use of regular equipment where possible is very important because it is *regular* equipment that will be available in business and industry where the disabled student will be employed. However, there are some pieces of equipment that cannot be reached and/or used safely by some disabled students (i.e. equipment designed to be used from a standing position).

However, before modifying the equipment for use by the disabled student, consider options and/or new technology that assists the student in lessening the handicapping effect of his/her disability. There are several recent technological advances which can increase disabled students' mobility and ability to use "regular" equipment and furnishings in vocational labs. The implications of these "new technology" items should be considered before making equipment modifications, since some modifications may restrict use by the able-bodied student. Of course, the cost and availability of new technology may be prohibitive for the student and/or the local educational agency. In such cases, other alternatives may be needed before many disabled students will be able to participate in a vocational program.

Where equipment needs to be adapted for use by the disabled student the first level of modification should be a factory option. Factory options to regular equipment will be more readily available for use in vocational education and employment. Also, they do not hinder the able-bodied student. Examples of factory options include a flashing light instead of the return bell on a typewriter for use by the deaf, or a light on a band saw to illuminate the cutting surface for the low vision student.

If no factory options are available that will make certain types of equipment accessible, then there are two alternatives to consider. First, the teacher with the assistance of the student and/or other knowledgeable person might design and construct some type of adaptive aid or device to make regular equipment accessible. Examples include some type of jig or fixture to hold the material being worked, or perhaps a ramp and platform to raise the wheelchair student to a desirable work height.

The second option is to use an alternate piece of equipment, i.e., a smaller version or a different piece of equipment to achieve the same results. For example, a router and router table could be used instead of a shaper, or a portable sabre saw instead of a band saw.

If neither of these options can be used to make the equipment accessible, the next step is to review the specific objectives and the reasons for requiring the use of the specific piece of inaccessible equipment. Perhaps the objective needs to be modified. For example, in an auto body program, there might be an objective stating that each student will paint a complete car. It would be difficult for a student confined to a wheelchair to paint the top of the car. Therefore, if the objective were modified to indicate that all students would be able to paint a complete *product*, the wheelchair student could paint small items, such as motorcycles, to learn the competencies of auto painting. To do this, the student could use the regular equipment and therefore would have access to the vocational program. See section VI for detailed information about making equipment accessible.

Where to Begin

Many vocational teachers raise questions about the feasibility of including physically impaired students in their regular programs. Can they perform the required competencies? Can they use the equipment? Will they be able to find employment if they complete the program? Can I handle the student? These concerns are real, but they are not insurmountable.

The following areas of change are suggested as starting points to surmounting barriers to the physically disabled. First, each vocational teacher must do some "attitude" modification. Part of this adjustment should include an optimistic outlook on the success potential for each student with a physical disability. In other words, focus on the *abilities* rather than the *disabilities* of each student. Remember, the fact that a student is physically impaired does not mean that he/she is handicapped educationally or occupationally.

Vocational teachers need to expand their view of the range of employment possibilities in their occupational cluster. Many vocational teachers have had occupational experience near the top of their occupational hierarchy (i.e., tool and die maker, chef, office manager, registered nurse, farm manager). Vocational teachers with these types of occupational experiences may tend to gear their programs toward the higher level jobs, forgetting that each occupational cluster has several levels and types of jobs. While many of the higher level jobs may or may not be appropriate for the physically disabled, it should be realized that there are several related jobs that would be appropriate. Vocational education programs can, and should prepare students for the job that best meets the interests, abilities, and needs of each student. For instance, a building trades program may be geared to preparing carpenters. Some physically disabled students may be able to complete the program and find employment as a carpenter (i.e., a hearing impaired student). On the other hand, a student who is confined to a wheelchair will probably have difficulty finding a job as a carpenter because of the mobility required at the construction site. This does not necessarily mean that he/she should not be allowed to enroll and participate in the program. This program may prepare the wheelchair student for employment in a prefabricated housing factory or some other related, support occupation, such as a lumber company or hardware store. In these related cases, participation in the vocational program can assist the physically disabled student just as much as the able-bodied student in gaining employment.

It takes team-work to effectively program for the physically disabled. Support from personnel in guidance, special education, rehabilitation, etc. along with student and parental support are generally required for maximum success. Therefore, vocational teachers need to become "team" players, cooperating with others for the benefit of the student.

Part of this team effort call for effective vocational guidance and counseling. The physically disabled, just like their able-bodied peers, may have unrealistic occupational aspirations, either above or below their abilities and aptitudes. In addition, some physically disabled students may use their disability as an excuse for not participating in aspects of the course. To deal with such conditions, vocational guidance and counseling must take the total team approach, and all members of the educational team must use their expertise together. A good source of specific information about this area of concern, is Guidance, Counseling, and Support Services for High School Students with Physical Disabilities, available from the Technical Education Research Centers (address in section VIII). This document is an excellent resource that provides in-depth information about guidance and counseling for the physically disabled.

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Section II

WHO ARE THE PHYSICALLY DISABLED

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WHO ARE THE PHYSICALLY DISABLED

Introduction

A discussion of physical disabilities by general type may seem to imply that disabled individuals can be meaningfully and adequately described with categorizing terms like "blind," "deaf," "epileptic," "diabetic," "cerebral palsied," etc. The implication suggests that once disabled persons are labelled with such terms, the extent of their limitation(s) is made clear. In reality, nothing could be further from the truth. All physical disabilities may vary widely in terms of extent and severity. Each physically-disabled person is *first and foremost a unique individual* who faces a unique challenge in the context of his or her own unique situation.

In fact, categorizing terms like those above offer nothing more than a general indication of the nature of an individual's disability. Such terms give no hint about the extent, severity, or peculiarities of an individual's condition. An accurate appraisal of any person's physical disability can only be formed in the light of competent professional diagnosis and direct contact and interaction with the individual.

This point must be stressed at the outset, before discussing general types of disabling conditions, to make it clear that categorizing disabilities for discussion purposes does not imply a similar categorizing of disabled persons. *It must also be emphasized here that any of the general factors discussed below as characteristics of a particular disability may or may not apply to specific individuals with that disability.* And even if the general factor is present, the resulting limitation for any person can only be accurately assessed in terms of that person's manner of coping with it. For some individuals, emphasizing a related or complementary strength or asset may well compensate for a particular limiting factor. And it must also be mentioned that having one type of physical disability does not preclude a person from having or developing another. In fact, certain types of physical disabilities frequently do accompany other types, as is noted below. In such cases, the resulting condition of multiple disability may require specialized diagnosis and specialized educational skills to serve the individual effectively.

For our discussion, we will first categorize physical disabilities into two major groups: 1) those that involve sensory impairments and 2) those that involve orthopedic and/or health impairments.

Sensory Impairments

In general, the two senses most commonly susceptible to physical disability are hearing and seeing. Both of these senses may be impaired in various ways and to varying degrees. Hearing impairments range from deaf to partially hearing. Visual impairments range from blind to partially seeing. The characteristics of these sensory impairments differ greatly among individuals, both in precise nature and extent.

For example, a hearing impairment may result from the inability to detect sounds at certain levels of the decibel scale, or from the inability to distinguish among sounds that are equally well detected. A visual impairment may affect the quality of visual perception, or it may limit the range of perception without affecting visual quality. Some hearing-impaired individuals benefit from sound amplification via a hearing aid. Others do not. Some visually impaired persons benefit from increased light intensity. Other benefit from diminished light intensity.

To say, therefore, that a person is "deaf" (or "hard-of-hearing") or "blind" (or "functionally blind") gives little indication of the precise nature of the sensory limitation. And certainly the appropriate corrective or supplementary aids for the impairment are not implicit in such terms. Planning educational service to sensory-disabled persons requires a detailed frist-hand knowledge of each individual, and of his or her specific impairment.

Hearing Impairments

The ability to hear is clinically assessed in relation to the volume (measured in decibels) and the pitch or frequency (measured in cycles per second, or "cps") of sounds which can be detected and correctly interpreted by an individual. Generally, hearing ability is evaluated in terms of broad levels and ranges of auditory perception, rather than in terms of fixed numerical points. For example, deafness might be technically defined as the ability to detect sounds with frequencies of 500, 1000, or 2000 cps only at decibel levels of +82 or higher. Partial hearing loss might be defined as the ability to detect sounds with frequencies of 500, 1000, or 2000 cps in the decibel range between +16 and +81.

However, more meaningful definitions of deafness and partial hearing loss, in terms of educational considerations, can be given. Deafness can be defined as a hearing impairment of sufficient severity that an individual must rely solely on vision or other non-auditory senses for communication. Partial hearing loss can be defined as a hearing impairment of sufficient severity that an individual must rely somewhat, although not entirely, on vision for communication.

Hearing impairments can be broadly categorized as either conductive or sensorineural in nature. Conductive hearing loss resluts from an obstruction in the passage of external sound waves through the outer and/or middle ear to the nerve center of the inner ear. Often, surgery or adaptive devices like hearing aids are helpful for this type of hearing disability. Progressive hearing loss due to old age tends to be conductive in nature. Sensorineural hearing loss results from a malfunction or obstruction in the passage of auditory nerve impulses from the nerve center of the inner ear to the auditory nerve area of the brain. Adaptive devices and surgery tend to be less helpful for this type of hearing disability. Profound congenital deafness tends to be sensorineural in nature.

It is generally agreed that the most serious disabling consequence of hearing impairment is lack or loss of the ability to communicate verbally. Of course, spoken language is fundamental to communicating and interacting with those around us. And the ability to communicate and learn via the printed word is based on a previously acquired spoken language. It generally holds true, therefore, that persons who have acquired major hearing impairment in the pre-lingual period (before the development of normal speech) are more severely disabled than those who have first acquired a spoken language and then later have acquired hearing impairment.

Intensive, specialized, and highly individualized training and therapy may help prelingually deaf persons to develop some measure of language-based communicative skill.

Various alternate communication forms are available and workable for the hearing and/or speech impaired. By general type, they may be classified as manual, oral, or total communication. Manual communication consists of various forms of sign language and fingerspelling. Oral communication emphasizes development of speech, speech reading (or lipreading), and writing. Total communication involves using a simultanious combination of manual and oral communication. Classroom considerations relevant to hearing impaired students may include the services of an interpreter, notetakers, seating arrangements to maximize non-audio perception, etc.

Vision Impairments

Loss of vision need not be a major limitation for education and career development. There is a wide range of possible causes and factors of vision loss, and there is also a wide selection of compensating methods and devices. Of prime importance is that visually impaired persons develop mobility and orientation within their environment. Mobility implies moving about with confidence in one's surroundings. Orientation implies an accurate perception, via non-visual senses (auditory, tactile, etc.), of the nature of the surrounding environment. It should also be noted that there are relatively few blind individuals who have absolutely no perception of light. Most have some residual visual ability which can be developed and used. Frequently, then, visually impaired persons may have visual functioning which exceeds their visual acuity.

Blindness. An individual is considered legally blind if his or her corrected vision in the better eye is 20/200 or less, or if his or her visual field subtends an angle no greater than 20 degrees. A more practical definition is that a person is considered educationally blind if he or she can not use print materials. This implies that visual communication is basically not functional for these individuals.

Partially Seeing. An individual is legally considered partially sighted if his or her corrected vision in the better eye is between 20/60 and 20/200. Again, a more functional definition is that a person is considered partially sighted if he or she reads primarily large print, or regular print under specially aided conditions. This implies that visual communication is functional only to a limited extent for these persons.

Most visually impaired persons require some special aid in order to achieve maximum mobility and orientation within their surroundings, and in order to develop non-verbal communcation skills. Mobility is most commonly assisted by using either sighted persons or dogs as guides, and/or by using long canes when walking. Effective orientation in the environment must be based primarily on tactile impressions from handling and touching recognizable objects, rather than on verbal, descriptive explanations. In the classroom, non-verbal communication skills are necessary in order to read resource materials, take notes, and complete assignments in written form. Of course, written materials and written classwork should be geared to the needs of the individual as much as possible for visually impaired students. When written communication is necessary, special optical aids for light and magnification will allow some students to read printed materials visually. Non-visual reading and writing is most commonly based on the braille system, which uses a raised, tactile letter code.

Orthopedic and Health Impairments

Orthopedic and health impairments vary widely by type, characteristics, and extent. For purposes of discussion, they can be broadly categorized as 1) impairments of the nervous system, 2) impairments of the musculoskeletal system, 3) other health impairments, and 4) multiple impairments. In general, these disabilities involve impairments of bones, joints, muscles, or consciousness which limit an individual's ability to move, function, or manipulate tools and devices in normal daily living.

Impairments of the Nervous System

Impairments of the nervous system may generally be considered as some of the potentially most limiting conditions. Impairment of the nervous system may affect intellectual capacity, motor control (including mobility), consciousness, communication skills, and sensory perception. Major impairments of the nervous system include cerebral palsy, epilepsy, multiple sclerosis, and spinal cord injuries.

Cerebral Palsy. Cerebral palsy is a general term applied to several types of neuromuscular disorders. These conditions result from damage to the brain tissue which may occur before, during, or shortly after birth, or in the early developmental years.

Physical conditions which may accompany cerebral palsy include spasticity (uncontrolled, irregular reflex movements of various muscle groups), dyskenisia (involuntary muscle movements or conditions, such as rigidity, etc., which may be affected by emotional stress), ataxia (incoordination due to balance, posture, or sensory factors), or combinations of the above. Various areas of the body may be affected, and there is considerable variation among individuals in the degree of disability.

Mental or learning disabilities which may be associated with cerebral palsy include distratibility (difficulty in selecting or focusing attention on specific environmental stimuli), perseveration (a tendency to retain or repeat a mental formation, with carry-over effects to other unrelated mental or perceptual formations), dissociation (a tendency to perceive only the parts or components of a stimulus or mental configuration without perceiving the whole), or disinhibition (inability to withhold reactions to motor-response stimuli).

Cerebral palsy is often characterized by multiple disabilities. The secondary or accompanying disabilities which are most frequently associated with cerebral palsy are speech impairments and mental retardation. Sensory disabilities may also be evident. However, none of these secondary disabilities necessarily accompanies cerebral palsy.

Because of the potential for severe and multiple disabilities related to cerebral palsy, it is often difficult to accurately assess the exact limitations and assets of cerebral palsied individuals. Specialized diagnostic and evaluative care must often be resorted to, and educational programs must often be highly individualized.

Epilepsy. is a disability due to intermittent imbalancies of electrical activity in the brain. It is most often characterized by seizures which may cause a temporary change in consciousness or a temporary loss of muscular control. Major seizures involving loss of muscular control, or convulsions, are called Grand Mal seizures. Minor seizures, which may appear only as brief lapses of attention, are called Petit Mal seizures. Since the seizures are not predictable, persons with epileptic disabilties may in addition experience feelings of anxiety or distress, and attitudinal or learning disabilities may result.

Medication can be very successful for controlling or eliminating seizures in diagnosed cases of epilepsy. However, the milder seizures may remain unrecognized, undiagnosed, and untreated. Special considerations for educators who deal with epileptic-disabled persons include knowing how to render appropriate aid in case of a seizure, and possibly allowing extra time, or make up sessions, for disabled persons whose class or study time has been interrupted by seizure activity.

Multiple Sclerosis. Multiple sclerosis is a disability resulting from hardening or scarring of the tissue which surrounds nerve fibers. Symptoms may include muscle weakness, spasticity, tremors, and sensory disabilities. The disease tends to be progressive, but progress is usually intermittent. Due to the wide variety of possible symptoms and the progressively changing levels of severity, educational programming for the multiple sclerosis disabled should be highly individualized and adaptable.

Spinal Cord Injuries. Spinal cord injuries are frequently the result of automobile-, work-, or sports-related accidents. Resulting paralysis typically affects limbs, extremities, and/or muscle groups at and below the site of spinal injury. Paraplegia (paralysis of the legs and lower body) and quadriplegia (paralysis of the entire body from the neck or shoulders down) are the most familiar manifestations of such injuries. It is possible, however, that only one extremity (hand or foot), limb, or one localized body area may be affected.

Generally there is no mental impairment involved in spinal cord injuries, even in severe cases of paraplegia and quadriplegia. However, persons with spinal cord injuries usually must face massive adjustments in self-image as a result of acquiring the disability. Psychological and/or emotional adjustments must be made, emphasizing acceptance of the impairment and coping with the accompanying limitations. Spinal cord injured, even those with extreme physical disabilities, have been known to achieve extremely well in virtually all major life pursuits.

Musculoskeletal Impairments

Musculoskeletal impairments affect the bones, the voluntary musculature, and/or the involuntary musculature with varying degrees of impairment.

They may be congenital, or they may be disease- or accident-related. Some musculoskeletal disabilities are progressive and some are not. In any case, these disabilities do not entail mental or intellectual impairments, except as they may be related to the attitudinal or emotional adjustment of the disabled individual.

Muscular Dystrophy. Muscular dystrophy is a general term used to describe a number of related diseases which result in progressive degeneration of the skeletal or voluntary musculature. This disability often manifests itself first in later childhood, afterwards progressing at different rates of speed and to varying degrees with each individual. Frequently, muscular dystrophy disabled persons become confined to wheelchairs. Because of the progressive nature of the disease, it may ultimately affect the life expectancy of the disabled individual. However, no mental impairments are involved. Typically, educational programming for persons with muscular dystrophy emphasizes mental attributes and assets, inasmuch as physical skills and abilities are likely to decrease as the condition progresses.

Spina Bifida. Spina bifida is a congenital abnormality resulting from the failure of spinal vertebrae to develop and close around the spinal cord. Typically, the spinal cord remains unsupported and unprotected in either the upper (neck) or lower region, or in both regions. Paraplegia (paralysis of the lower body) is a common manifestation of this condition. Spina bifida impaired are often confined to wheelchairs. In some cases, incomplete fusion of the upper region of the spinal column may result in hydrocephalus, which obstructs the normal flow of cerebral spinal fluid. This latter condition may put unusual pressure on brain tissues, and often results in retardation.

Limb Deficiencies. Limb deficiencies may be either congenital or acquired by accidental injury or surgical amputation. Such impairments may involve the loss of all or part of one or more limbs or extremities. No mental impairment is entailed in such disabilities. Current and continuing advancements in prosthetic therapy, coupled with positive emotional adjustment and a coping attitude, can allow most of these disabled persons to learn and function as though virtually unimpaired.

Other Musculoskeletal Impairments. Various other musculoskeletal disabilities deserve consideration as they relate to educational programming. Common congenital disabilities of this sort are malformation of the heart, congenital dislocation of the hips, and clubfoot. Nowadays, with early detection and adequate medical treatment and therapy, many cases of these disabilities are completely correctable. Scoliosis, or curvature of the spine (usually in a lateral direction) may be either congenital or acquired later in life. Progressive scoliosis may eventually limit mobility, and may entail the use of a wheelchair. Legg-Perthe's disease involves bone deterioration, pain, and may result in eventual wheelchair use due to loss of mobility. Rheumatoid arthritis may result in mild to severe inflammation of the joints. Medical attention must also be given to possible inflammation of the eyes, with the chance of visual impairment. In severe cases, classroom attendance may be precluded due to pain and lack of mobility. It should be emphasized that no mental impairment is entailed in any of these other musculoskeletal disabilities.

Other Health Disabilities

There are a number of other disabling or potentially disabling health conditions which may have implications for educational programming. Some are hereditary and some are infections in nature. None of the following entail any degree of mental impairment, however, and some may involve only minor physical limitations.

Perhaps most common among these is diabetes mellitus. This is a metabollic disorder wherein sugar in the body is not properly converted into energy or stored for future use. Close attention to diet, blood insulin level, and physical exercise will allow most diabetics to maintain a balance of body sugar suitable for normal daily functioning. Failure to maintain a proper balance of body sugar may bring on various symptoms ranging from general uneasiness to irritability, light headedness, or temporary loss of consciousness. In neglected, aggravated, or severe cases, permanent loss of vision may occur, and life expectancy may be affected. As a rule, educators dealing with diabetics should be aware of the nature and symptoms of the condition, and should know how to be of help in time of need.

Two common health disabilities of an hereditary nature are cystic fibrosis and hemophilia. Cystic fibrosis is a disorder of the glandular bodily secretions, including the mucous glands. It typically interferes with breathing and digestion. Extensive medical and therapeutic treatment is often entailed, which may disrupt schooling for varying periods of time. With adequate care and training, cystic fibrosis disabled persons can learn to administer a measure of self-therapy and can become reasonably independent, though life expectancy is frequently affected. Hemophilia is a genetic disorder of the clotting mechanism of the blood. It affects males predominantly. It may involve extensive internal or external bleeding, and cases range from mild to severe. Again, no mental impairment is entailed with cystic fibrosis or hemophilia.

Typical disabling health conditions which are infectious in nature are polio, pulmonary tuberculosis, and osteomyelitis. Severe cases of polio or ostemyelitis may restrict motion and mobility. These diseases can all be medically treated with good success, especially if detected early. Again, no mental impairment is entailed.

Multiple Impairments

Multiple impairments may involve any combination of the above, or other disabilities. Multiple disabilities are often, but not always, present among the cerebral palsied. In many cases, the composite effect of multiple impairments leads to greater limitations than would seem to be suggested by the separate disabilities alone. For example, persons with both sensory and motor/mobility limitations may acquire varying degrees of mental retardation as a result of restricted interactions with environmental stimuli. Also, a combination of apparent disabilities may serve to mask or obscure an additional, non-apparent disability. For example, a cerebral palsied individual with both speech and visual impairments may not be able to indicate that learning disabilities such as perseveration or dissociation are also factors in his or her condition.

It must be remembered, however, that accompanying or multiple disabilities are neither inevitable nor insurmountable. And it is especially important that each multiple disabled person be dealt with individually in the context of his or her entire known situation. Often only expert specialized diagnostic and evaluative procedures will reveal the full extent of multiple disabiltiies, and educational programming for the multiple disabled usually requires highly individualized programming.

Section III

ASSESSMENT OF THE PHYSICALLY DISABLED STUDENT

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ASSESSMENT OF THE PHYSICALLY DISABLED STUDENT

Introduction

For effective educational planning and implementation, teachers must be aware of each student's abilities and level of performance in relation to the objectives and content of courses. This information should be obtained before the course begins, or as near the beginning as possible. In this way teachers can identify students with special needs early in a course, before it is too late to meet their educational needs.

Every teacher should be concerned with the following questions: Is the student prepared with the necessary prerequisites to study and learn the course content? Has the student already mastered the competencies to be taught? If so, which competencies?

These questions are the "keys" to pre-assessment. In most models of systematic instructional decision making, pre-assessment is an integral component for *all* students. Pre-assessment data can be collected through various means, such as standardized test scores, previous grades, teacher-made paper and pencil tests, performance tests, reviewing the student's previous work, observing the student at work, interviewing the student, interviewing the parent, etc. This information should then be used to determine the most effective and efficient path for learning.

In addition to providing a data-based guide to instruction, pre-assessment can be used to identify students who will probably have difficulty completing a course successfully. Those students so identified should then be assessed in more detail to determine their needs and the best way to meet them.

In many cases, physically disabled students will require an in-depth assessment and evaluation. This detailed assessment may require assistance from specialists trained in vocational evaluation. These specialists generally have expertise in giving various validated tests and interpreting data collected from them. There are two major categories of validated vocational evaluation tests, 1) psychometric tests, and 2) work samples.

Psychometrics

Psychometric tests are most generally standardized paper and pencil tests that measure interest, cognitive intelligence, psychomotor traits, etc. These tests, interpreted by trained professionals, become part of an in-depth vocational evaluation. However, caution must be taken when using these tests with some physically disabled persons. For instance, many hearing impaired and vision impaired students do not read at their grade level. In these cases the result of the psychometric test may be less valid because the students lack reading and/or writing skills.

While there has been some criticism of psychometric tests, they can be helpful in determining a student's academic skill level. If a student does not have the necessary academic skills to complete the vocational program, psychometrics may be helpful in determing areas to be remediated.

Some examples of psychometric tests are listed below. This list is not an endorsement for these particular tests nor is it intended to include all possibilities.

-- Differential Aptitude Test

-- Multiple Aptitude Test

-- Brainard Occupational Preference Inventory

-- Minnesota Vocational Interest Inventory

-- General Aptitude Test Battery

-- SRA Mechanical Aptitude Test

Work Samples

Work samples are well defined activites that simulate actual job tasks, materials, and tools for the purpose of assessing job skill potential and vocational interests. In theory, if a student can show success with a simulated sample of work, there is a high probability that the student may be successful in that occupation.

There are several validated, commercially available work sample systems. These systems vary in cost, content, space required, amount of training required to administer, etc. Some examples of these are listed below. Again, this list is given for purposes of example and is not intended as an endorsement of these systems.

-- Vocational Evaluation System By Singer (VES)

-- Jewish Vocational and Employment Service (JEVS)

-- The Tower System

-- Vocational Information and Evaluation Work Sample (VIEWS)

-- Valpar Component Work Samples

Some of the commercial work sample systems are more applicable for the physically disabled than others. Therefore, a comparison of these systems should be conducted before purchase (see Scelfo & Micali, 1978). Also check with the local special education director or with the Department of Rehabilitation Services to see if there is an assessment lab functioning and available in your region of the state.

Teacher - Made Assessment Instruments

While in depth, formal assessment can provide a good profile of a student, some physically disabled students will not require such a detailed profile for success in a vocational program. And, in some local educational agencies the services of a vocational evaluator and sophisticated testing are not readily available. Never-the-less, the vocational teacher will need some information about the physically disabled student in addition to, or as part of, the regular pre-assessment data. This information can be gained through teacher-made assessment instruments and an expanded pre-assessment component in a vocational education program.

Teacher-made and/or adapted instruments can be either paper and pencil psychometric type (to determine math skills, writing skills, reading skills, ability to follow directions, etc.), work sample type (having the student complete specified operations that simulate work required competencies), or both. These assessment instruments probably will not be "standardized" and validated. However, if they are derived from the course content and activities, they will have "face validity," and the assessment data collected will be usable by the teacher in terms of the objectives and content of the specific course.

Some excellent examples of these teacher-made assessment instruments are included in Module 3, "Strategies for Assessing the Student's Present Level(s) of Performance," which is part of the handbook, A System for the Identification, Assessment and Evaluation of the Special Needs Learner in Vocational Education (Albright, et.al., 1978). Copies of this handbook are available through Curriculum Publications Clearinghouse at Western Illinois University (see reference section for address).

Assessment by Interview and Observation

When assessing and evaluating the physically disabled one of the most effective methods is to "ask" the student. Interviewing a disabled student can produce a wealth of useful information for vocational education programming.

Part of this interview can be aimed at determining the student's background experience in school and life, and to assess how these experiences might pertain to your vocational course. And it can help to identify the student's likes and dislikes, occupational aspirations, current level of performance, etc.

Another part of this interview can be geared to obtaining data about the student's physical abilities and learning style. This type of information will be needed for effective vocational education programming. The following lists of questions may be helpful in structuring interview or observation sessions:

Orthopedically Impaired Students:

1. How mobile is the student?
   (wheelchair, crutches, braces, etc.)
2. How developed are fine and gross motor skills?
   (upper torso, arms, hands, and fingers)
3. How about range of motion and reach?
   (side reach, forward, up and down)
4. Does the student have strength and endurance?
   (grasp, lifting ability, etc.)
5. What work height is the best?

Visually Impaired Students:

1. How does the student read and write?
   (Braille, large print, tape recorder)
2. How well developed are the student's orientation and mobility skills? (long cane, guide dog, memory, etc.)
3. How does the student absorb information the best?
   (touch, descriptions, combination, etc.)
4. Is there any residual vision?

Hearing Impaired Students:

1. How does the student communicate?
   (speech read, sign language, both - responds orally, etc.)
2. Does the student use a hearing aid?
3. Can the student function without a hearing aid?
   (loud machine noise may restrict use of hearing aid in lab)
4. What is the level of reading vocabulary?

An interpreter may be required when interviewing hearing impaired students. This third person may inhibit the student's responses. Therefore, try to use interview techniques that are nonthreatening, positive, and focus on the student's potential success in the program. Answers to these questions can help the vocational teacher plan and/or adapt a program for the disabled student. Remember, when interviewing the student, to use discretion and to preserve the right to privacy. And remember that interviewing physically disabled students may not always produce accurate data. Some disabled students may not be totally open when discussing their abilities and disabilities. Therefore, do not rely only on an interview for your assessment.

There are several resources available for guiding and/or assisting the teacher in interviewing the student. Valpar Corporation has developed the "Valpar Physical Functioning Questionnaire." While this questionnaire is intended to be used as part of a total vocational evaluation, it can be a guide for teachers. Module 3, "Strategies for Assessing the Student's Present Level(s) of Performance" (Albright, et.al., 1978) also includes some guidelines and formats for interviewing students and recording data.

Assessment and evaluation of physically disabled students is an important aspect of an effective vocational education program. However, buildings, facilities, equipment, etc. also need to be assessed and evaluated. The next three sections of this handbook deal with these considerations.

Section IV

GENERAL CONSIDERATIONS FOR ACCESSIBILITY

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GENERAL CONSIDERATIONS FOR ACCESSIBILITY

Introduction

In addition to an assessment of the physically disabled student, an evaluation of physical facilities is in order. Obviously, an architecturally accessible facility is mandatory if physically disabled students are to participate fully in appropriate vocational education programs. Participation involves full access to all programs, services, and activities that are provided for nondisabled students.

For a building to be accessible to the physically disabled, it must allow them to enter, to circulate and conduct their business inside, and to leave *without* assistance. In other words, accessibility means that physically disabled persons can function autonomously in our buildings and in our society.

General Access to School Buildings

Factors to be considered for general access to school buildings include transportation, parking, exterior walks and ramps, and entrances. Each of these factors is presented with key questions to assist the appropriate personnel in determining accessibility.

Transportation. If a physically disabled student does not have accessible transportation to and from school he/she will not be able to participate in regular school programs. Accessible transportation can be provided by the school district, the parents, the student or by public transportation.

Key Questions:

1. Is accessible transportation available?
2. Is accessible transportation provided by the school district?

3. Are the costs for use of accessible public transportation reasonable?

Parking. After arriving at school, the next consideration is accessible parking.

Key Questions:

1. Are there parking spaces designated for use by the physically disabled? (at least two spaces or two percent of the total, and are they kept clear of "regular" cars?)

2. Are the designated parking spaces wide enough for car and wheelchair, allowing room for the disabled person to leave and enter the vehicle? (12'6" wide for single spaces or 20'6" for double spaces) (figure IV-1)

3. Is the surface of the parking area smooth and firm?

4. Are parking areas free from ice and snow in the winter?

Exterior Walks and Ramps. Approaching the entrance of the school building involves considerations in site development. This includes exterior walkways and ramps.

Key Questions:

1. Are walkways provided from parking areas to the entrance?

2. Are the walkways wide enough to allow for wheelchair traffic? (5'0" wide to allow two wheelchairs to pass)

3. Are curbs and curbings provided with "cuts" or "ramps" with a negotiable slope? (1" rise for 12" run) (figure IV-2)

4. Are low hanging tree limbs and other overhead obstructions removed to prevent injury to the visually impaired?

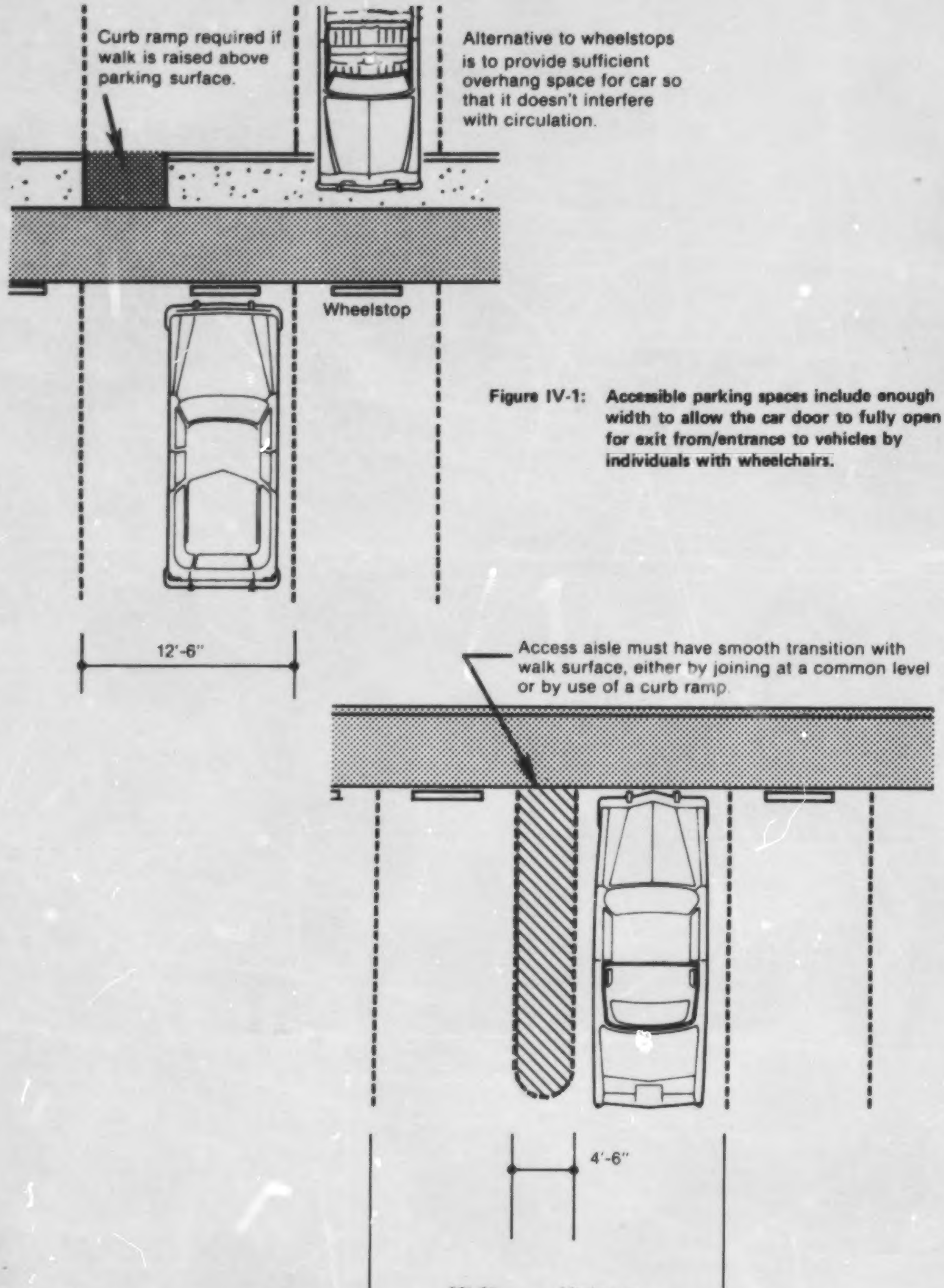
5. Are ramps and walks cleared of ice and snow in winter?

Entrances. How frustrating it must be for a disabled person to approach the school building only to find that he/she cannot enter because the entrance is not accessible.

Key Questions:

1. Are the door openings at least 32" in clear width?

2. Do the doors require an abnormal amount of strength or manipulation to open?



Curb ramp required if walk is raised above parking surface.

Alternative to wheelstops is to provide sufficient overhang space for car so that it doesn't interfere with circulation.

Access aisle must have smooth transition with walk surface, either by joining at a common level or by use of a curb ramp.

Figure IV-1: **Accessible parking spaces include enough width to allow the car door to fully open for exit from/entrance to vehicles by individuals with wheelchairs.**

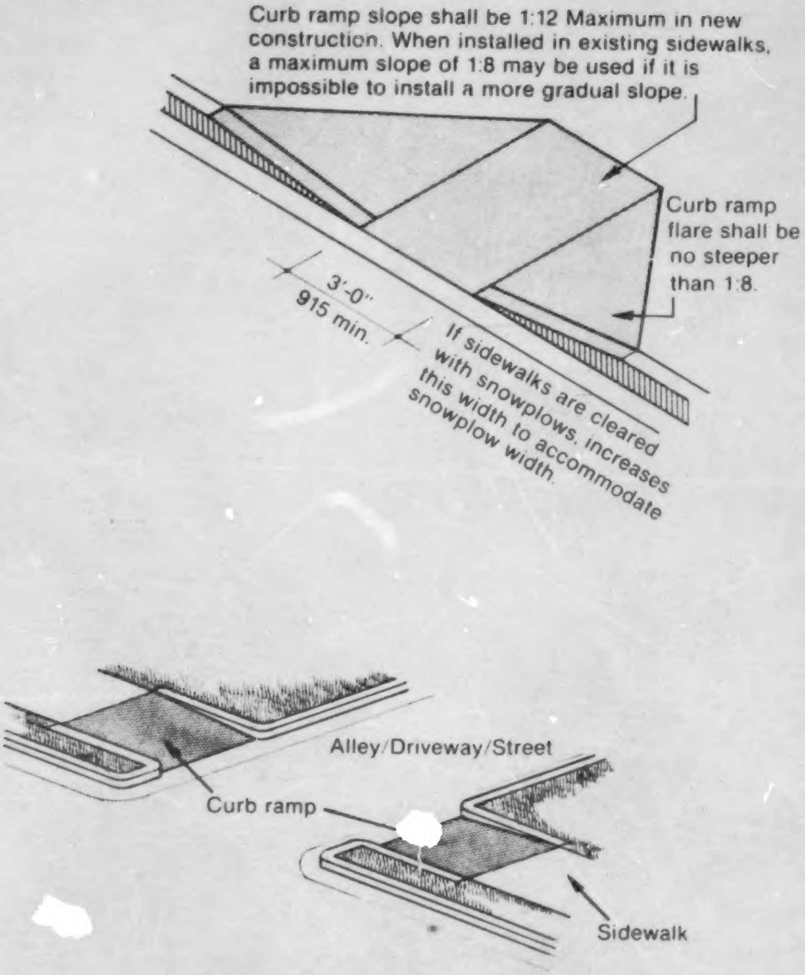

Curb ramp slope shall be 1:12 Maximum in new construction. When installed in existing sidewalks, a maximum slope of 1:8 may be used if it is impossible to install a more gradual slope.
Curb ramp flare shall be no steeper than 1:8.
3'-0"
915 min.
If sidewalks are cleared with snowplows, increases this width to accommodate snowplow width.
Alley/Driveway/Street
Curb ramp
Sidewalk

Figure IV-2: **Curb cuts increase mobility for indiviuals in wheelchairs, but if they are not well planned they can hinder mobility for the blind.**

3. Are the approaches on both sides of the door large enough to maneuver a wheelchair while opening the door? (figure IV-3)

4. Is the door handle at an appropriate height?

5. Is the threshold flush with the floor on both sides of the door?

Access to Vocational Education Labs

Once the physically disabled student has entered the school building, his/her circulation in the building and use of the necessary facilities must be considered for effective educational programming. Interior circulation and building use relates to hallways and stairways, toilet rooms, drinking fountains, signage, etc. Each of these factors are discussed briefly and key questions are listed for consideration and evaluation.

Hallways and Stairways. Traffic patterns must be considered in planning access to all required rooms and facilities in the school building. Traffic patterns may be complicated for many physically disabled students because of multi-level buildings, fire doors, stair wells, etc. Also, accessible traffic patterns must be provided for emergency exit in case of fire or some other potential disaster.

Key Questions:

1. Are the hallways wide enough to allow 2 wheelchairs to pass? (5'0" minimum) (figure IV-4)

2. If there are multiple levels in the building, are elevators, ramps, or lifts provided?

3. If there are stairs, are they designed for access with appropriate handrails, dimensions, and nosings?

4. If there are elevators, are the controls reachable from a wheelchair and are they marked in braille?

5. Are hallways waxed and highly polished? (This may increase the possibility of falling for the visually impaired.)

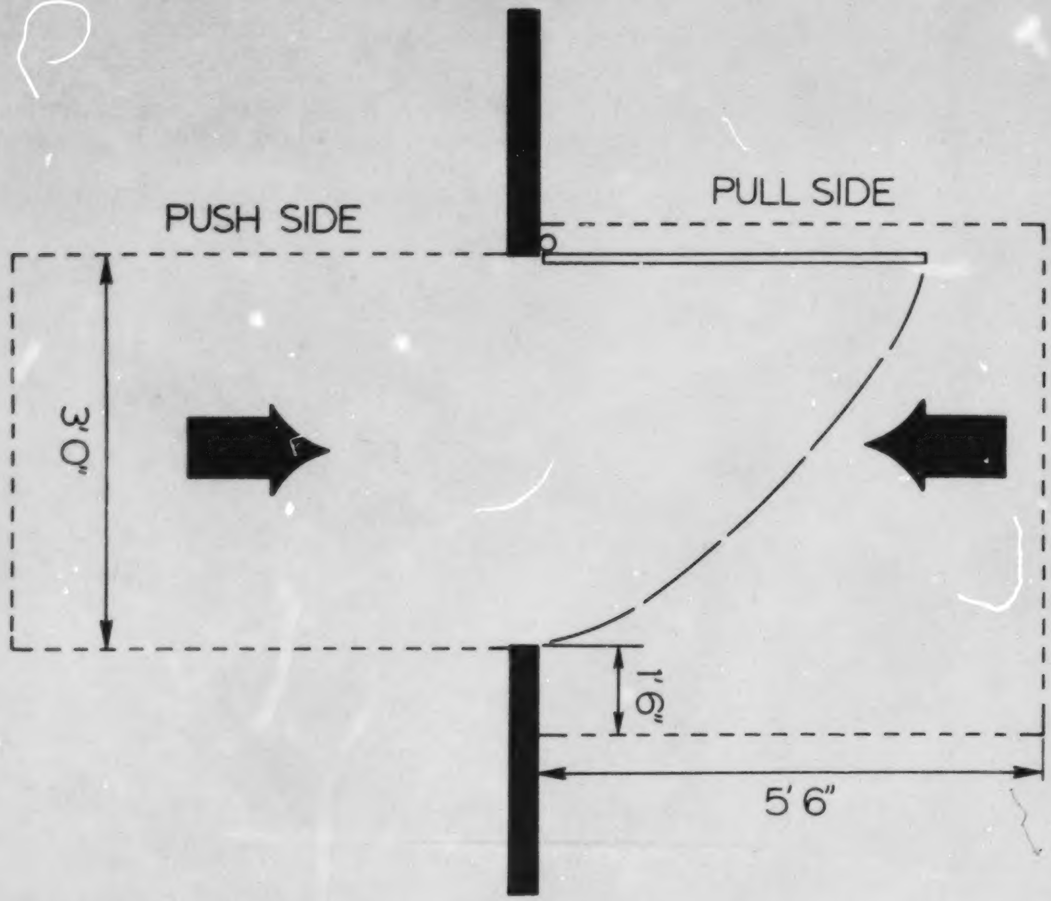

PUSH SIDE
PULL SIDE
3'0"
1'6"
5'6"

Figure IV-3: Manuvering space for wheelchairs needs to be provided on both sides of doors.

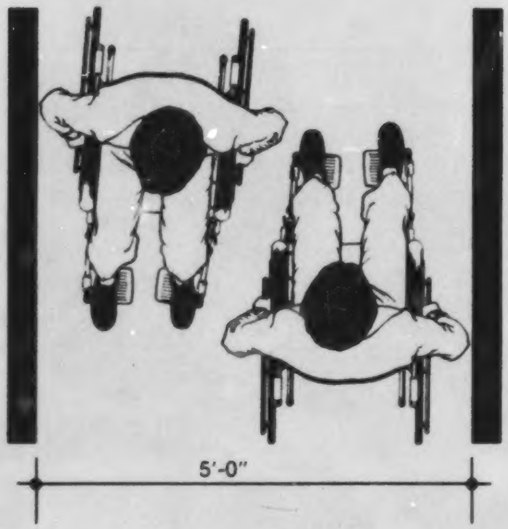


Figure IV-4: Hallways must be 5' 0" wide to allow two wheelchairs to pass.

Drinking Fountains. The use of drinking fountains is not just a convenience for many physically disabled persons. Many persons confined to wheelchairs need to increase their intake of fluids for good health. These people often have their body excretory functions adversely affected because they are continually sitting and immobile. Therefore, persons confined to wheelchairs need to increase fluid intake to dilute urine and help prevent kidneystones and urinary tract infections. These types of infections are a major cause of death for many paraplegics and quadriplegics.

Key Questions:

1. Are drinking fountains in accessible areas of the building?
2. Are drinking fountains placed at height equipped with controls that are usable from a wheelchair? Or, are cups provided?

Toilet Rooms. Because of the need for increased fluid intake and for the convenience of the physically disabled student, toilet rooms must be accessible.

Key Questions:

1. Is there an accessible restroom for each sex on each floor?
2. Is there at least one stall in each restroom that will accommodate a wheelchair?
3. Are sinks, faucets, towels, mirrors, and soap dispensers reachable and usable from a wheelchair?

Signage. Interior circulation in schools can be hindered if signs and numbers are not accessible.

Key Questions:

1. Are signs and room numbers provided to communicate necessary information to all students?
2. Are signs and room numbers made with raised figures and contrasting color backgrounds?

3. Are all signs and room numbers placed in locations that are consistent throughout the building and at an accessible height?

4. Do signs include the name of the lab to help orient the student?

Other Factors. There are other factors that need consideration for accessible interior circulation. These include visual and sound alarm systems, telephones, auditoria, cafeterias, libraries, etc. Vocational education programs are not the only programs in the school that require access for successful programming.

Accessibility Survey

The Capital Development Board of the State of Illinois has developed an accessibility compliance checklist and evaluation form (Form no. AC-1). This checklist coincides with the state codes for access, Accessibility Standards Illustrated.

To evaluate your school in terms of accessibility, the following steps are recommended:

1. Read and become familiar with the requirements presented in Accessibility Standards Illustrated.
2. Complete the evaluation questionnaire, noting areas and/or conditions that are not in compliance.
3. Compile a list of inaccessible items/areas for further study.
4. Make recommendations to remove and eliminate access barriers.
5. Remove and eliminate access barriers.

There are several resources to assist school personnel in completing the accessibility checklist. These include hiring professional architects, using consultants from the Capital Development Board, involving vocational architectural drafting students, etc. No matter which resource(s) used, the outcome goal should be accessibility.

BUILDING EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

FORM NO. AC-1
CDB
PAGE 1

NAME OF BUILDING ____________________ **CDB PROJECT NO.** ____________________

STREET ADDRESS ____________________ **CITY** ____________________

EVALUATOR ____________________ **% REVIEW** __________ **DATE** ____________________

STD. REF.	ITEM	YES	NO	CODE	REMARKS
3.5	**PARKING**				
3.5.9 3.5.2	1. Are there designated and marked accessible stalls close to building?			1	
3.5.4	a. If yes, are the stalls a min. 12'-6" wide or 20'-6" for 2 adjacent stalls?			2	
3.5.5	b. If yes, is there a min. of 2 or 2% of total up to 400 or 8 + 1% of total over 400?			3	
3.2.2 3.2.3	2. Is the parking area surface firm and smooth?			4	
3.2	**EXTERIOR WALKS AND RAMPS**				
3.1.1	1. Is there a walk from parking area to the major entrance?			5	
3.2.1	a. If yes, it is a minimum of 5'-0" wide?			6	
3.2.2	b. If yes, is it free of curbs or if curbs exist are there curb ramps?			7	
3.2.4	2. Do all slopes have a rise of less than 1-20?			8	
6.1.5	a. If no, do any rise more than 9"?			9	
6.1.1	b. If no, do they have level rest areas according to Section 6.1.1?			10	
6.3	c. If yes to 2a, are there handrails according to Section 6.3?			11	
3.2.6	3. Are all cross slopes less than 1-50?			12	
3.2.2	4. Are the surfaces of all walks and ramps firm and smooth?			13	
3.2.9	5. Is the path area free of hazards or are the hazards identifiable?			14	
3.2.8	6. Are they level at doors and do they extend a min. of 1'-6" past pull side of door?			15	
3.2.7	7. Are they free of gratings or if gratings exist, are the slots 3/8" or less in width and in the direction of travel?			16	
4.1	**DOORS**				
4.1.3	1. Do all entry, exit and passage doors have a minimum clear opening width of 2'-8"?			17	
4.1.5	2. Is the space between doors in series a min. of 4'-0" plus the width of one door?			18	
4.1.5	3. Do both doors in series open in same direction?			19	
4.1.1	4. Is the floor level a distance of 4'-0" or more on push side of door?			20	
4.1.1	5. Is the floor level a distance of 5'-0" or more on pull side of door?			21	

BUILDING EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

FORM NO. AC-1
CDB
PAGE 2

STD. REF.	ITEM	YES	NO	CODE	REMARKS
4.1.1	6. Are walls on pull side of doors at least 1'-6" from jamb?			22	
4.1.12	7. Is the bottom rail of all doors a minimum of 10" high?			23	
4.1.10	8. Are all thresholds a maximum ½" high or less?			24	
4.2.1	9. Is all opening hardware mounted 3'-0" to 3'-8" high?			25	
4.2.6	10. Is hardware knurled or have applied abrasive on fire exits, emergency, and doors to hazardous areas?			26	
5.1	INTERIOR CIRCULATION				
5.1.4	1. Do all corridors have a clear path 5'-0" wide or more?			27	
5.1.6	2. Do all corridors have a clear height of 7'-6" or more?			28	
5.1.1	3. Is there access to all areas without stairs, ramps or elevators?			29	
	4. If no to 3, are there stairs? If yes to this, answer the following:			30	
6.2.1	a. Are the risers 7" or less?			31	
6.2.1	b. Are the treads a minimum of 11" wide?			32	
6.2.3	c. Are the risers free of square edged nosings?			33	
6.2.6	d. Are there handrails 2'-6" to 2'-10" high and at 2'-0" if school is elementary?			34	
6.2.6	e. Does the handrail extend 1'-0" past the top and 1'-0" + one tread past bottom?			35	
6.3.7	f. Is there a tactile star on top of railing at main exit?			36	
6.2.10	g. Is there a barrier under bottom flight of stairs if occurring in a circulation path?			37	
	5. If no to 3, are there ramps? If yes to this, answer the following:			38	
6.1.1	a. Are any slopes greater than 1-20?			39	
6.1.5	b. Do ramps that rise more than 9" have handrails on both sides?			40	
6.1.5	c. Are the handrails 2'-6" to 2'-10" high and at 2'-0" if school is elementary?			41	
6.1.8	d. Does the maximum rise of slopes comply with Table 6.1.1?			42	
	6. If no to No. 3, is there an elevator? If yes to this, answer the following:			43	
7.1.10	a. Is the door and cab accessible?			44	
7.1.6	b. Are there visual and audible signals: Up — white, one ring; Down — red, two rings?			45	
7.1.5	c. Is call button maximum 3'-6" above floor?			46	

BUILDING EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

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STD. REF.	ITEM	YES	NO	CODE	REMARKS
7.1.4	d. Is there tactile floor designation on each jamb?			47	
7.1.14	e. Are controls mounted with highest button max. 4'-6" above floor and emergency button max. 2'-11" above floor?			48	
7.1.17	f. Is there an emergency telephone mounted in cab, max. 4'-0" above floor?			49	
7.1.15	g. Are there car position indicators?			50	
7.1.14	h. Are there tactile floor numbers beside floor buttons?			51	
7.1.16	i. Are there handrails on side walls of cab 2'-6" to 2'-8" high?			52	
6.3.9	7. Is there any unenclosed floor opening, landing, or balcony? If yes, answer following:			53	
6.3.9	a. Do unenclosed floor openings or landings have a guard rail 3'-6" min. height?			54	
6.3.9	b. Do balconies have a guardrail minimum 2'-2" high?			55	
8.1	TOILET ROOMS				
8.1.7	1. Is there at least one stall in each restroom 5'-0" x 5'-0" (Fig. 8.1.7) or 3'-0" wide (page 195)?			56	
8.1.9	2. Is there min. 2'-6" clearance under lavatory with water supply insulated if water above 105 degrees F.?			57	
8.1.10	3. Does lavatory have faucet that is operated by lever action?			58	
8.1.12.	4. Is there one urinal in each men's room with elongated lip max. 1'-5" above floor?			59	
8.1.13	5. Is the bottom edge of one mirror maximum 3'-2" above floor?			60	
8.1.14	6. Are all dispensers mounted maximum 3'-4" above floor to highest operable part?			61	
9.1	DRINKING FOUNTAINS				
9.1.1	1. Are there drinking fountains in accessible areas?			62	
9.1.2	2. Is the orifice max. 3'-0" high or max. 2'-6" if school is elementary?			63	
9.1.4	3. Does the control have lever action to operate?			64	
10.1	SHOWER ROOMS				
	1. Are showers provided? If yes, answer the following:			65	
10.1.1	a. Is there one stall min. 3'-0" x 3'-0" according to figure 10.1.1 for each sex?			66	
10.1.2	b. Are gang showers available without curbs?			67	
10.1.4	c. Are water controls single lever?			68	
10.1.6	d. Are soap dispensers mounted a max. 3'-4" above floor?			69	
10.1.5	e. Is the max. water temp. 105 degrees F. or less?			70	

BUILDING EVALUATION FORM
FOR
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FORM NO. AC-1
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STD. REF.	ITEM	YES	NO	CODE	REMARKS
12.1	**SIGNAGE**				
12.1.1	1. Are tactile signs provided for room use, corridor and location identification?			71	
12.2	**EMERGENCY WARNING SIGNALS AND ALARMS**				
12.2.1	1. Are both visual and audible signals and alarms provided?			72	
12.2.5	2. Are fire alarm activating controls mounted between 3'-4" and 4'-0" above floor?			73	
11.1	**TELEPHONES**				
11.1.1	1. Is highest operable part max. 4'-6" high with side access, 4'-0" high with front access?			74	
15.1	**APPLIANCES**				
15.1.1	1. Is the highest operable part 3'-4" to 4'-0" above floor?			75	
16.3	**SPECIAL EQUIPMENT**				
16.3.3	1. Are 2% of lockers not over 4'-0" high with 3'-6" clear access in front?			76	
16.3.5	2. In each lab, is there one station with clear space under 2'-6" high, 3'-0" wide, 2'-0" deep?			77	
16.3.6	3. Are aisles, between library stack areas a minimum of 3'-6" wide?			78	
16.7	**AUDITORIA, ASSEMBLY HALL, STADIA**				
16.7.1	1. Is there an auditorium, assembly hall or stadium? If yes, answer the following:			79	
16.7.1	a. According to all previous standards are all areas accessible?			80	
16.7.2	b. Are there special seats and wheelchair spaces according to tables 17.7.2, 16.7.6, and 16.7.7?			81	
16.8	**SERVICE COUNTERS**				
16.8.2	1. Is there a place at all service counters which is 3'-0" above floor?			82	
16.8.4	2. Is the clear space in front of all counters at least 2'-8" wide?			83	
16.9	**CAFETERIAS**				
16.8.3	1. Is the tray sliding counter a max. of 3'-0" above floor?			84	
16.9.2	2. Do tables have a min. 2'-6" clearance under top?			85	
16.9.3	3. Is the clear space between chairs a min. of 3'-0"?			86	

Section V

ACCESSIBILITY IN VOCATIONAL EDUCATION LABS

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ACCESSIBILITY IN VOCATIONAL EDUCATION LABS

Introduction

Once the physically disabled student has access to and mobility throughout the school building, the next area of concern is entrance to and circulation in the vocational education lab(s). Considerations for laboratory planning and layout are crucial in terms of accessibility to vocational education programs for the physically disabled. References are made throughout this section to the specific relevant code sections in the Illinois standards for accessibliity.

Entrance

To provide entrance to a lab, doorways must have at least a 32" wide clear opening to allow for wheelchair entrance. In addition, the hall or apporach area to the doorway must allow enough space to maneuver a wheelchair while opening the door. This means a minimum of 3'6" on the push side of the door and 4'0" on the pull side of the door (see Section 4.1, Accessibility Standards Illustrated) (figure V-1).

Entrance doors to labs must have a flush, smooth surface on the bottom 10" (i.e. a smooth pickplate). If doors do not have this, footrests on wheelchairs may get caught against the door styles and/or panels (see Section 4.1.12., Accessibility Standards Illustrated) (figure V-2).

Thresholds should be flush with the floor surface where possible to allow for safe crossing by wheelchairs and by the visually impaired. Where they are not flush, the maximum height allowed is 1/2" and they must be beveled to allow wheelchairs to cross.

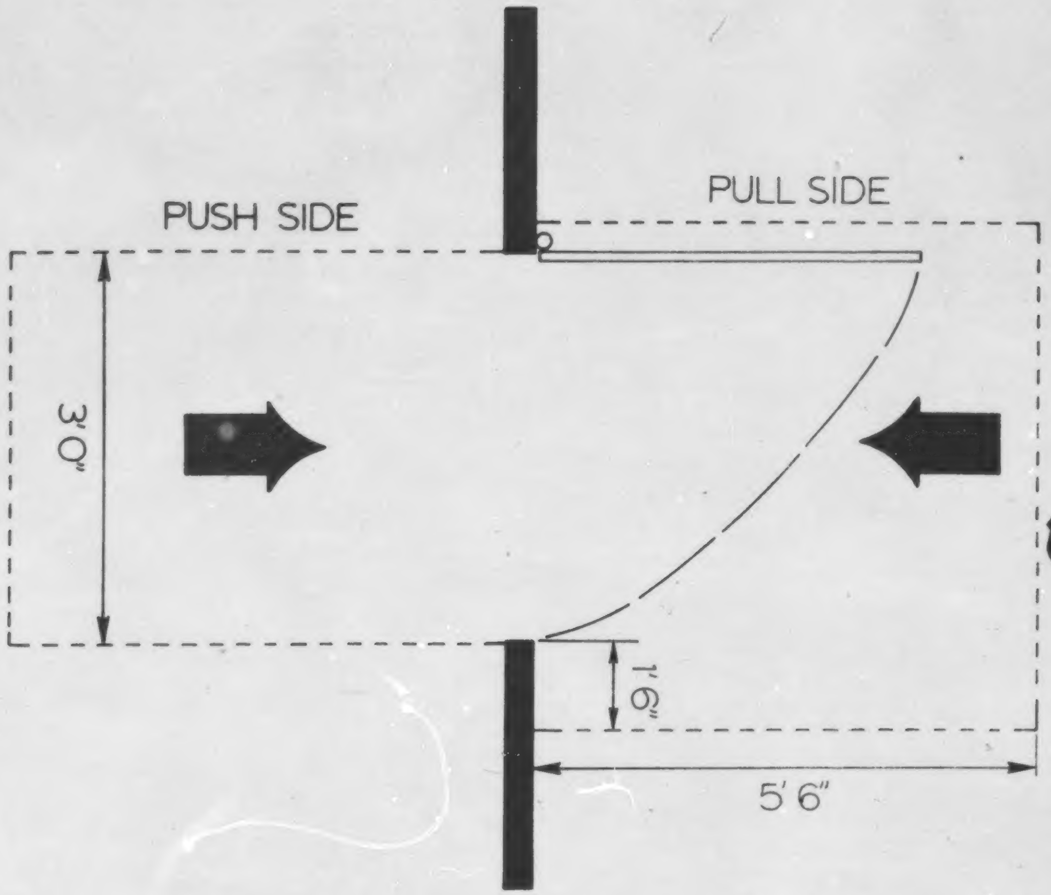
PUSH SIDE
PULL SIDE
3'0"
1'6"
5'6"

Figure V-1: Maneuvering space for wheelchairs needs to be provided on both sides of doors.

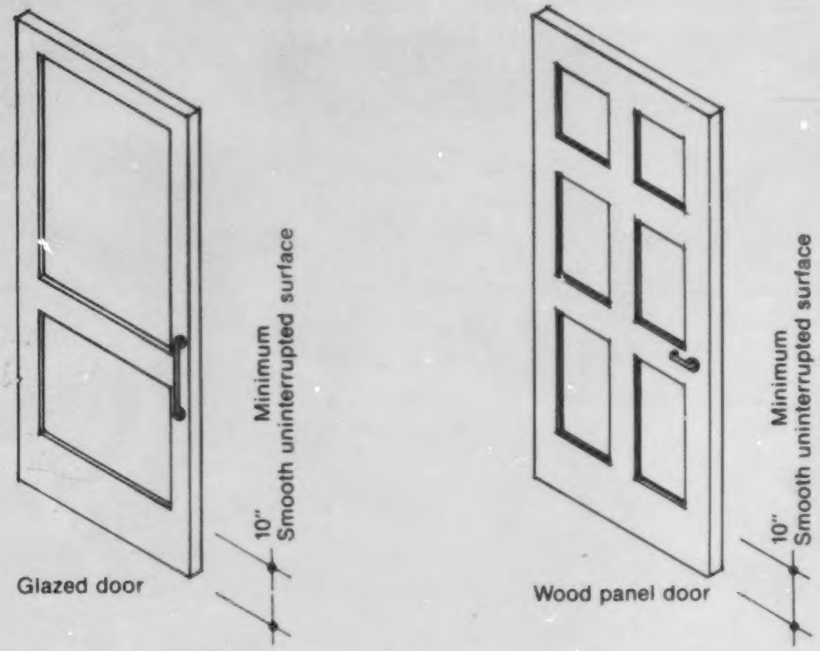
Minimum
Smooth uninterrupted surface
10"
Glazed door
Minimum
Smooth uninterrupted surface
10"
Wood panel door

Figure V-2: Interior doors must have a smooth kickplate at least 10" wide at the bottom of the door.

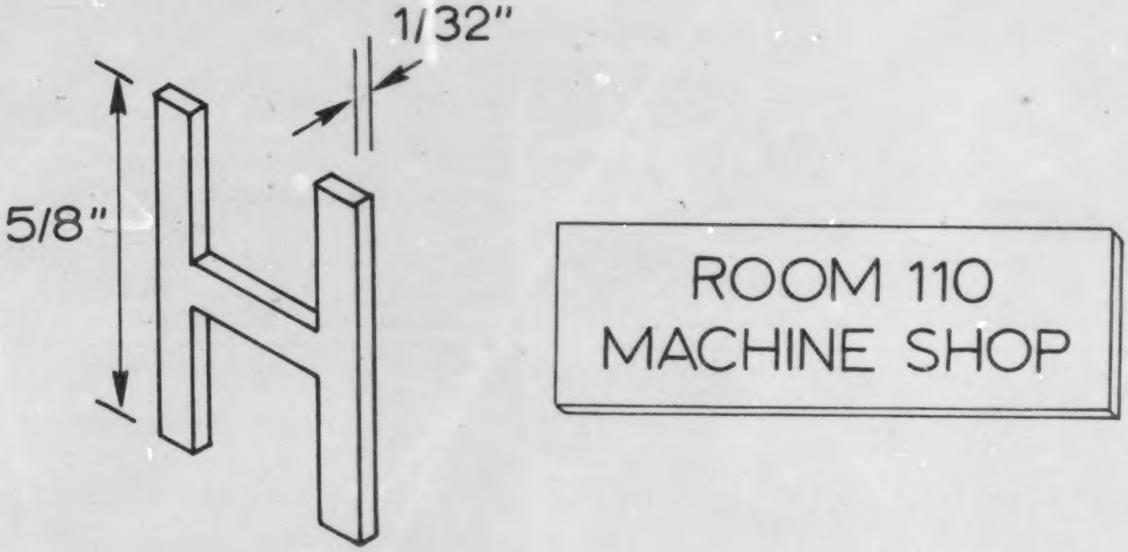
1/32"
5/8"
ROOM 110
MACHINE SHOP

Figure V-3: Accessible signs will have raised numbers and letters with descriptive wording to help orient the visually impaired student. These signs should be placed on the wall to the latch side of the door at a height readable from a wheelchair.

Door handles should be designed to be usable without requiring great force or manipulation. The placement of door handles in relation to distance from the floor should also be considered (see Section 4.2, Accessibility Standards Illustrated).

Another aspect of entrance relates to room identification and signage. Room numbers and/or signs must have raised letters (at least 1/32") that are a minimum of 5/8" in height and must have a sharply contrasting background color. They should be located on the latch side of the door, 4'6" to 5'10" from the floor (see Section 12.1, Accessibility Standards Illustrated) (figure V-3).

Circulation in Labs

After entrance is gained, the next concern is vocational laboratory interior circulation. Aisles, workstations, lockers, etc. must be accessible and usable. Of course, any doors and doorways inside the lab which must be negotiated by the physically disabled should conform to the same criteria as entrance doors.

Aisles. After entrance is gained to the lab, the first consideration should be student movement and flow. Aisles must be wide enough for a wheelchair and the main traffic aisles should be free of protrusions that may be potential hazards for the visually impaired. Such aisles are considered "safe aisles". Safe aisles should be a minimum of 3'0" wide. However, to allow room for a walking student to pass a wheelchair, the aisle should be 4'0" wide. Aisles that are 5'0" wide will allow two wheelchairs to pass.

Aisles in the vocational education lab should be well planned. This will benefit all students, especially the visually impaired. Aisles should lend themselves to safe, smooth traffic flow to lecture and equipment areas in the lab for *all* students.

Another related concern deals with aisle space around individual pieces of equipment. If the program includes setting up, taking down, and cleaning the piece of equipment, requiring a student to move around the piece of equipment, then be sure to allow at least 3'0" clear space for access on the appropriate sides. However, be aware that to maneuver a wheelchair into position, it generally requires more space than 3'0". The smallest diameter required to turn a complete circle in a wheelchair is slightly over 5 feet (figure V-4).

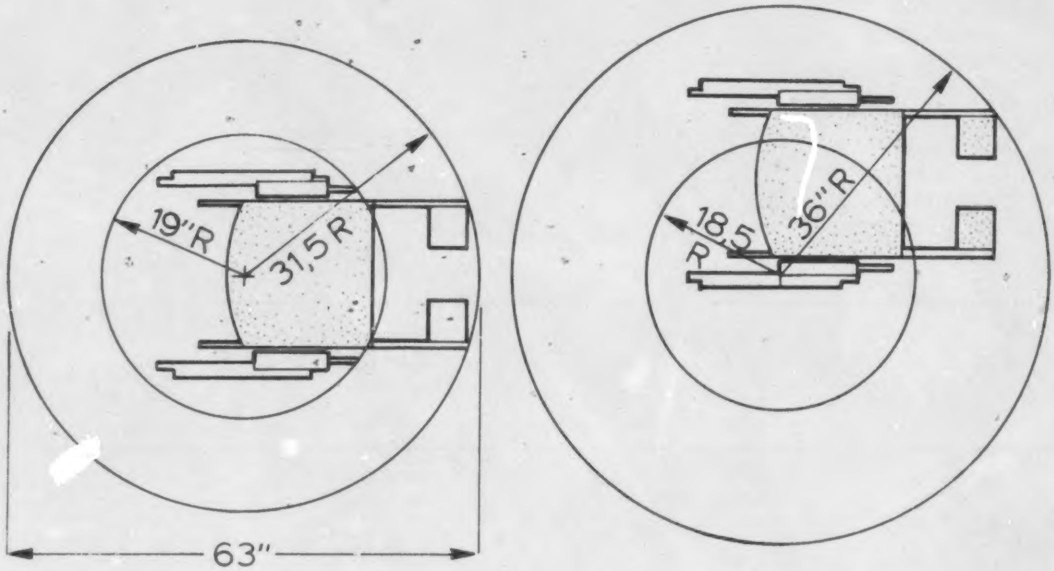

Figure V-4: Wheelchair turning radii.

Work Stations. At least one work station in each lab should be accessible to the physically disabled. The accessible work station should have a clear space of 3'0" wide, 2'0" deep, and 2'6" high beneath a fixed top (see Section 16.3.5, Accessibility Standards Illustrated) (figure V-5). To make a workstation accessible, it may mean raising a table, purchasing an accessible desk or table, making an accessible workbench, etc. (figure V-6). Often, modifications can be made with little expense (figure V-7). It may be desirable to have an accessible work table or bench that is adjustable in height. For example, Edward Hines Veterans Hospital has a work table that is attached to a hydraulic lifting unit from a dentist's chair. The table can be adjusted to the best height for each disabled person who uses it.

There are several other ways to construct adjustable work tables and/or benches. For example, table legs can be made out of two pipes, one of which fits inside the other, with a series of holes, and a pin for adjustment (like jack-stands for cars) (figure V-8). Possible modifications are really only limited by the ingenuity of the teacher/designer, and by the funds available.

Lockers. If lockers and/or other storage places are provided for students, two percent must be accessible to the physically disabled. Accessible lockers should stand between 9" and 48" from the floor, and they must have a clear maneuvering space of 3'6" in front (see Section 16.3.3, Accessibility Standards Illustrated). These specifications must also be met for the location of tool panels and cabinets. Tools and stored items cannot be reached from a wheelchair if they are high off the floor.

Other Considerations. Several other items should be considered for access and safe circulation in a vocational education lab. First, floor surface should be considered. Shag and some other types of carpet are difficult for

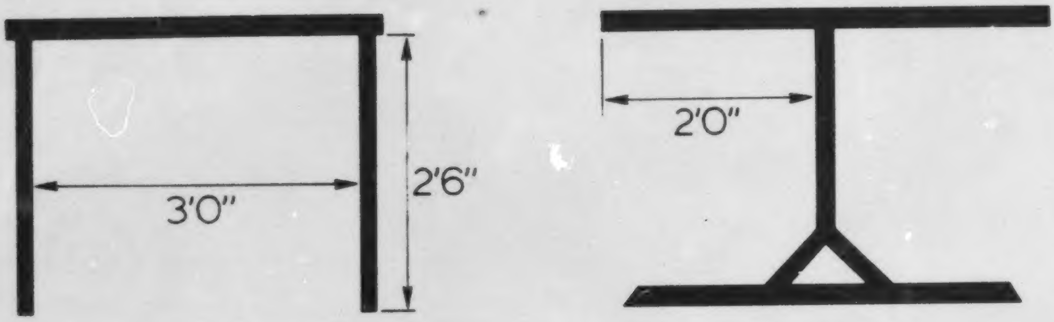

Figure V-5: An accessible workstation for a student confined to a wheelchair will be 3' 0" wide, 2' 0" deep, and 2' 6" high.

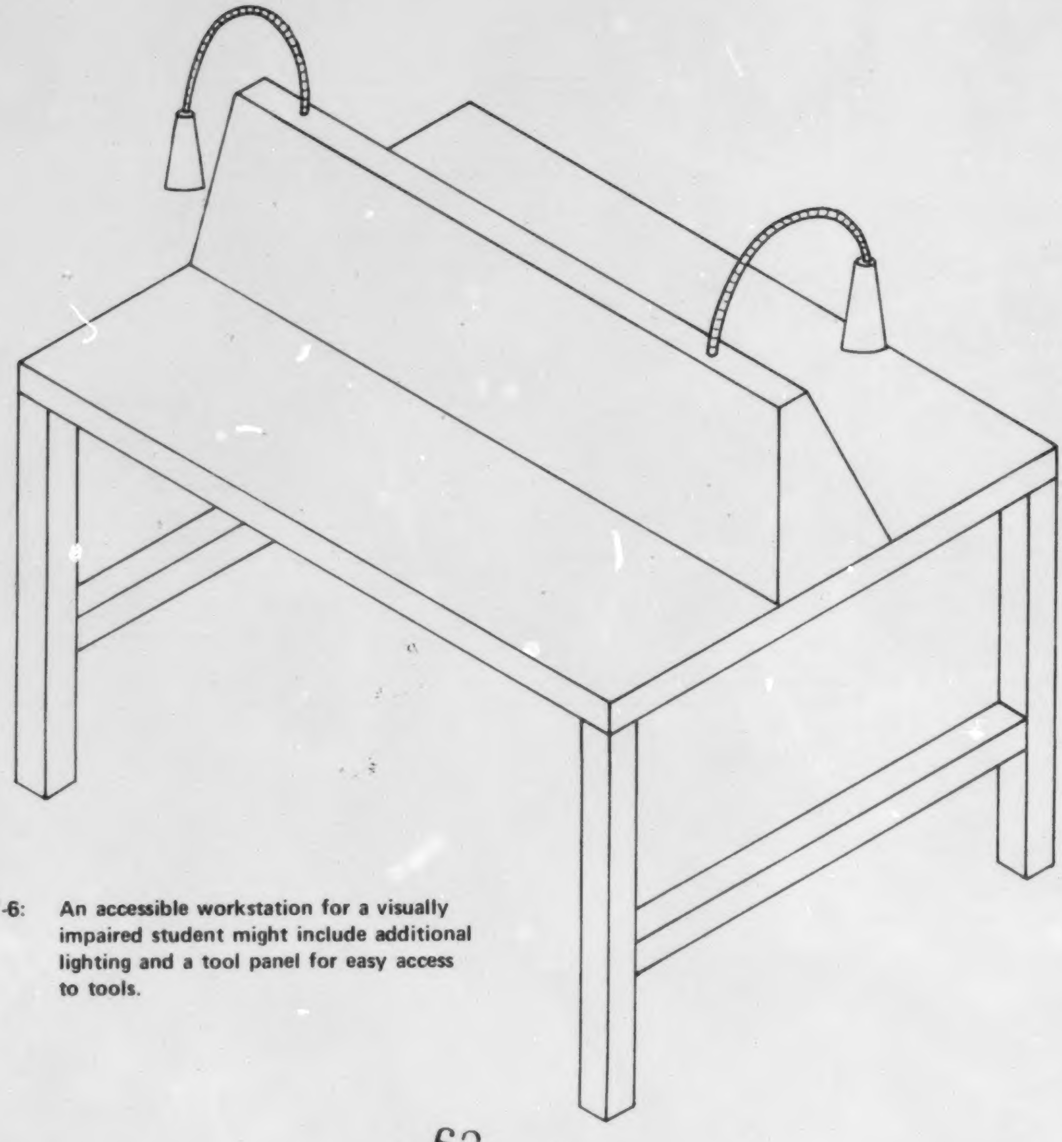

Figure V-6: An accessible workstation for a visually impaired student might include additional lighting and a tool panel for easy access to tools.

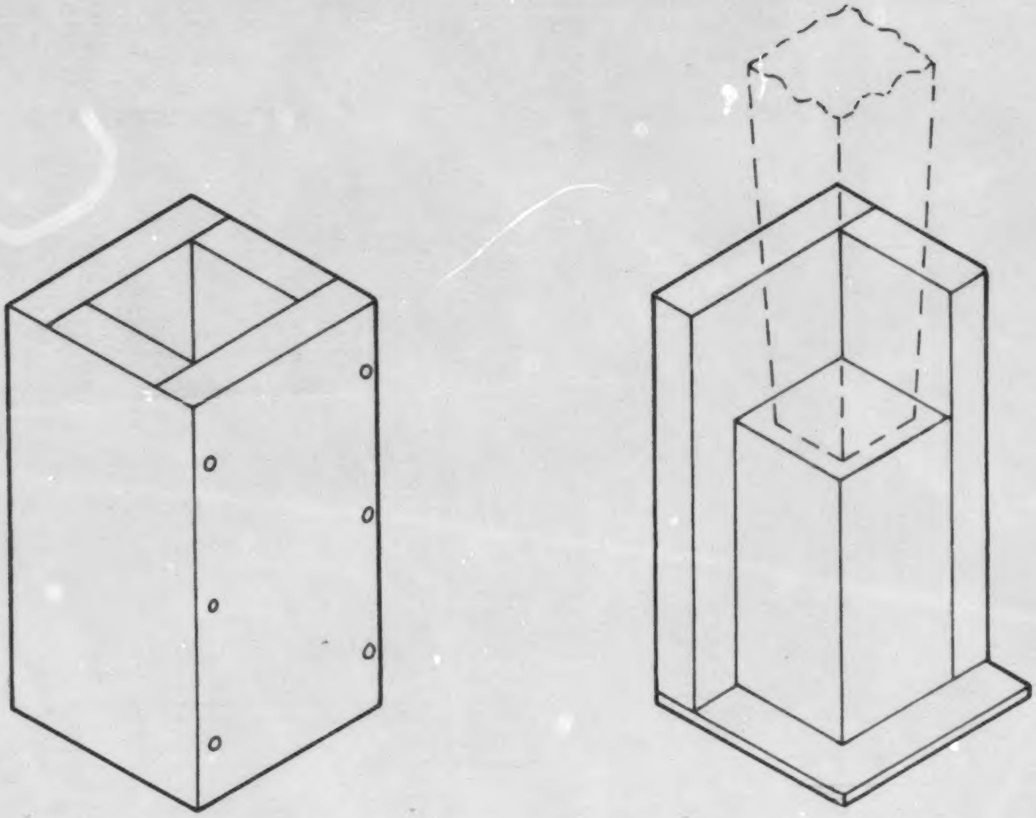

Figure V-7: Tables can be raised with blocks such as these to allow enough space for wheelchairs.

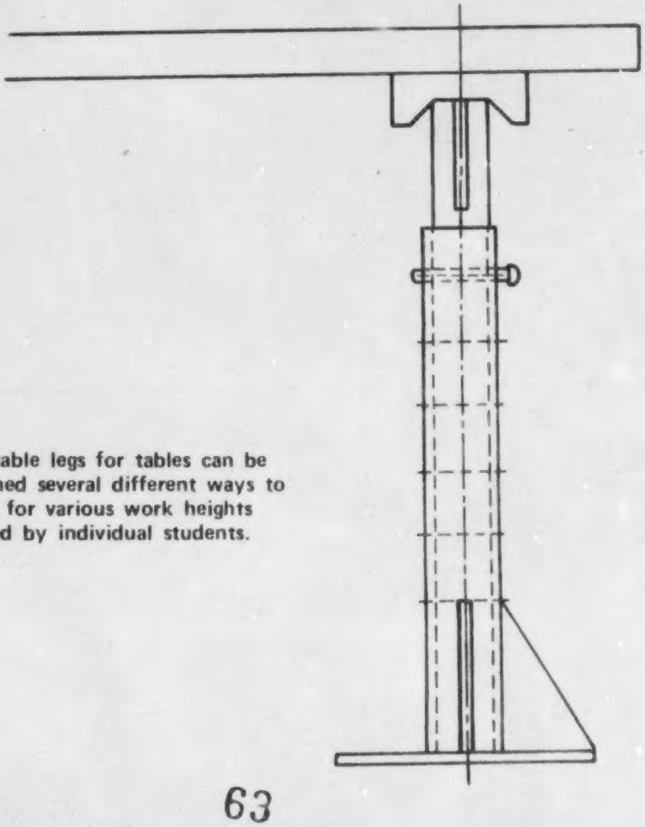

Figure V-8: Adjustable legs for tables can be designed several different ways to allow for various work heights needed by individual students.

wheelchairs to move across. Highly waxed, smooth floor surfaces may increase the possibility of a fall for a visually impaired student or a student with walking disabilities. Also, "good housekeeping" is a must. Material scraps and other items left on floors may obstruct student flow and increase the possibility of falls.

The concept of "good housekeeping" must also be kept in mind when consideration is given to such items as trash recepticles, moveable furniture (i.e., chairs, tables, desks), moveable machinery, and/or tools, rugs and mats, and other items that could be referred to as "moveables." Any and all of these items if left on the floor or work surfaces in the laboratory can become irratating or dangerous for individuals with reduced vision or mobility. Specific locations for moveables should be designated and these items should be maintained in their specified locations.

Lighting and color are important considerations in the lab for all students, especially for the visually impaired. Increased illumination and high contrast colors may greatly assist the partially sighted student.

Alarm systems in the lab and throughout the school should use both sound and sight. Without a visual alarm or warning system, the hearing impaired student may not be aware of dangers.

Doors in the lab which lead to hazardous areas (i.e., chemical storage, electrical control rooms) should be identified in some way. This could be done by knurling or texturing the knob to warn the visually impaired student of a hazard on the other side of the door.

Space and other architecutral limitations may make it very difficult to arrange an existing vocational lab to make it accessible. If this is the case, professional consultants may be needed to suggest possible solutions for access. Where total accessibility can not be achieved, the goal should be to provide as much accessibility as possible.

Laboratory Accessibility Survey

A laboratory evaluation form for accessibility for the handicapped has been developed for assistance in identifying and eliminating barriers in vocational education laboratories. To evaluate your laboratory in terms of handicapped access, the following steps are recommended:

1. Read and become familiar with the requirements presented in Accessibility Standards Illustrated and in this handbook.
2. Complete the evaluation questionnaire, noting areas and/or conditions that are not in compliance.
3. Compile a list of inaccessible items/areas for further study.
4. Make recommendations to remove and eliminate access barriers.
5. Remove and eliminate access barriers.

This evaluation checklist is designed to be used by the vocational education teacher. Additional resource personnel may be able to assist by making suggestions for solving accessibility problems that are identified by the teacher(s).

LABORATORY EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

NAME OF LABORATORY ________________ ROOM NUMBER ________

SCHOOL BUILDING ________________ CITY ________

EVALUATOR ________________ DATE ________

ITEM	YES	NO	REMARKS
ENTRANCE TO LABORATORY			
1. Do all entry and exit passage doors have a minimum clear opening of 32" in width?			
2. Does the approach on the pull side of the door allow enough room to manuver a wheelchair? (level floor 5' 0" away from the door with at least 1' 6" clear from the jamb on the handle side)			
3. Does the approach on the push side of the door allow enough room to manuver a wheelchair? (level floor 4' 0" away from the door)			
4. Do the entrance doors have a flush, smooth bottom rail at least 10" high?			
5. Are thresholds a maximum of ½" high and are they beveled for wheelchair access?			
6. Are door handles at a reachable height and are they easy to operate?			
7. Are room numbers and descriptive signs installed on the latch side of the door between 4' 6" and 5' 10" from the floor?			
a. Do signs have high color contrast?			
b. Do signs have raised letters or some other tactual means for reading?			

LABORATORY EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

ITEM	YES	NO	REMARKS
CIRCULATION IN THE LABORATORY			
1. Aisles			
a. Are aisles between furnishings, equipment, countertops, etc., at least 3' 0" wide?			
b. Are "safe" aisles provided to and from classroom area for the visually impaired?			
c. Is manuvering space provided for wheelchairs in front of, and around, equipment and work stations?			
2. Work Stations			
a. Is there at least one accessible work station in the laboratory (clear space beneath a fixed top of 3' 0" wide, 2' 0" deep, and 2' 6" high)?			
b. Are provisions made for access to various work stations in laboratories where multiple work stations are utilized during a class session or unit?			
c. Are work stations well lighted?			
3. Lockers, Cabinets, Tool Storage			
a. Are 2% of the lockers not over 4' 0" high from the floor and do they have a 3' 6" manuvering space in front?			
b. Are cabinets that contain tools and/or materials for class activities reachable from a wheelchair?			
c. Are cabinets that contain tools and/or materials for class activities well marked visually and tactually for the hearing and vision impaired?			
d. Are cabinets and other storage areas that contain dangerous materials well marked visually and tactually?			
e. Are the mechanisms for opening cabinets and other storage areas easy to operate?			

LABORATORY EVALUATION FORM
FOR
ACCESSIBILITY FOR THE HANDICAPPED

ITEM	YES	NO	REMARKS
4. Safety and Warning Devices			
a. Are both visual and audible alarms for fire and other emergencies provided?			
b. Are fire alarm activating controls mounted between 3' 4" and 4' 0" above the floor?			
c. Are floors and traffic areas of the laboratory free from material scraps and other materials that might cause falls?			
EQUIPMENT UTILIZATION			
1. Is required laboratory equipment reachable from a wheelchair?			
2. Do controls on required pieces of equipment have tactual markings for visually impaired students?			
3. Are factory options that make equipment and/or furnishings accessible available?			
4. Are adaptive aids/devices available to make equipment usable by the handicapped?			
5. Is there an alternative piece of equipment or an alternative technique that would make course activities accessible?			
6. Do the course/unit objectives need to be modified and/or individualized for individual handicapped students?			

Section VI

ACCESS TO VOCATIONAL EDUCATION EQUIPMENT

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    Orthopedically Impaired 59

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    Hearing Impaired 72

ACCESS TO VOCATIONAL EDUCATION EQUIPMENT

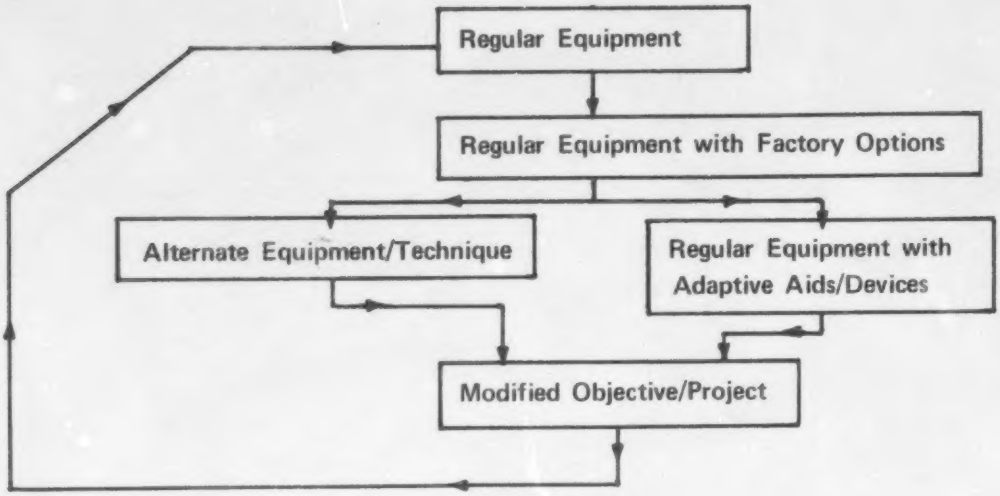
Introduction

To successfully complete most vocational education programs, the students will need to develop and utilize some degree of proficiency with various pieces of equipment. This need is the same for both the able-bodied students and the disabled students enrolled in the program.

Some modifications may be required to provide access to the equipment in the vocational education lab to physically disabled students. These modifications may relate either to the lab equipment or to the disabled student. The preference is to have the physically disabled student use regular equipment without modification. Many disabled students, particularly the hearing and vision impaired, can safely use regular equipment, given proper instruction. If regular equipment can not be used safely, consider recent technological advances that make the physically.disabled student more mobile and better able to use regular equipment. This type of technology should be considered because it does not alter the equipment that is designed for use by the able-bodied.

If the appropriate "new" technology is not available, then the equipment may need modification. Figure VI-1 shows the levels of equipment modification for access.

The first level of modification should be a factory option, since factory options to regular equipment will be more readily available for use in employment, and since they do not hinder the able-bodied student. Examples of factory options include a flashing light instead of the return bell on a typewriter designed for the deaf or a light on a band


Regular Equipment
Regular Equipment with Factory Options
Alternate Equipment/Technique
Regular Equipment with Adaptive Aids/Devices
Modified Objective/Project

saw to illuminate the cutting surface for the low vision student. If there are no factory options available to make equipment accessible, then two alternatives are suggested. First, the teacher might construct some type of adaptive aid or device to make regular equipment accessible. Examples include some type of jig or fixture to hold the material being worked, or perhaps a ramp and platforms to raise the wheelchair student to a desirable work height.

The second option is to use an alternate piece of equipment - i.e., smaller version or a different piece of equipment to achieve the same results. For example, a router and router table could be used instead of a shaper, or a portable sabre saw instead of a band saw.

If neither of these options can be used to make the equipment accessible, the next step is to review the specific objectives and the reasons for requiring the use of the inaccessible piece of equipment. Perhaps the objective needs to be modified. For example, in an auto body program, there might be an objective stating that each student will paint a complete car. It would be difficult for many paraplegics to paint the top of the car. Therefore, if the objective were modified to indicate that all students would be able to paint a complete product, the paraplegic student could paint small items, such as motorcycles, to learn the competencies of auto painting. To do this, the student could use regular equipment and therefore would have access to the vocational program.

Equipment Modifications

Because the accessibility requirements for safe use of vocational education equipment vary greatly according to the type of disability, the specific considerations are presented below by general type of disability.

Orthopedically Impaired

One of the major considerations for use of equipment by the orthopedically disabled is range of reach. Students confined to wheelchairs have difficulty getting close enough to the equipment for safe use. The range of reach forward generally is quite a bit less than that on the side (figure VI-2). In some instances, the wheelchair student needs only to approach the equipment sideways to use it. However, this may be uncomfortable for extended periods of time.

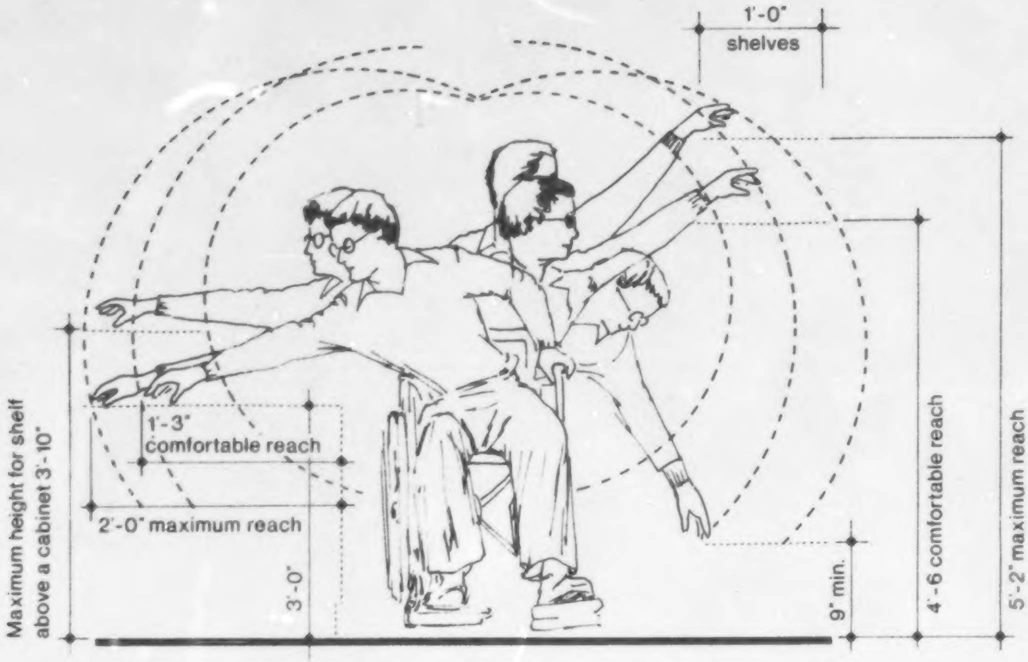

1'-0"
shelves
Maximum height for shelf above a cabinet 3'-10"
1'-3"
comfortable reach
2'-0" maximum reach
3'-0"
9" min.
4'-6 comfortable reach
5'-2" maximum reach

Figure VI-2a: Range of Reach from a wheelchair - side reach

There are some "new" technology items available to make wheelchair students more mobile and to increase their range of reach. Examples include the Levo Standup Wheelchair (figure VI-3), the Mainstreaming Wheelchair, and the Amigo Wheelchair. These wheelchairs increase the possibilities for equipment use for many orthopedically impaired students. For example, use of Levo Standup Wheelchairs in a vocational lab would allow the disabled student to use much of the equipment that is designed for use from a standing position. Also, cabinets, tool panels, etc. that are high on the wall can be accessed by use of the Levo chair. To effectively use a Levo chair, the school (or special education coop) might have one chair available for use in the vocational education labs. The

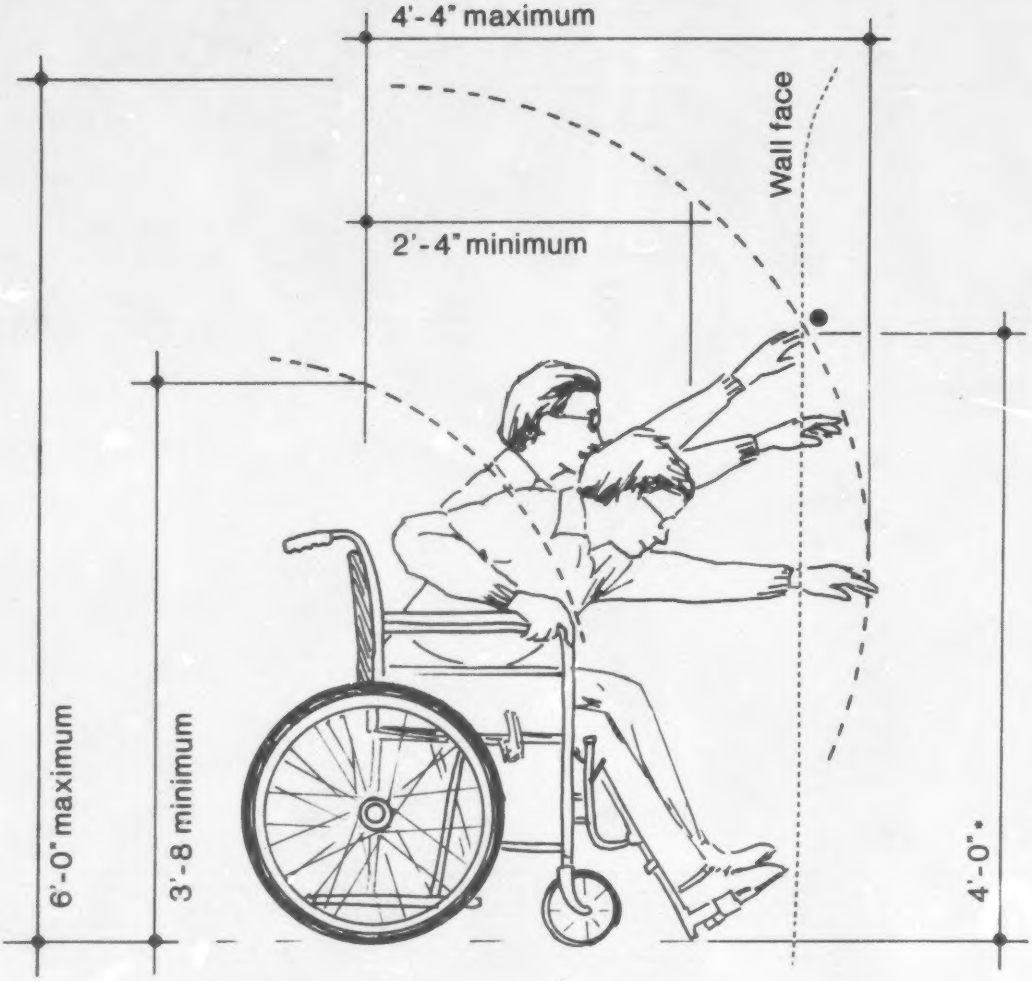

4'-4" maximum
Wall face
2'-4" minimum
6'-0" maximum
3'-8 minimum
4'-0"*

Figure VI-2b: Range of Reach from a Wheelchair - forward reach

orthopedically impaired student could use his/her standard wheelchair during the day in the academic classes. Upon entering the vocational education lab, the student could transfer into the Levo chair for the lab period, facilitating use of the regular equipment.

Though the Levo chair opens many educational avenues, there are precautions to consider. Once the chair is in the standing position it is stationary. This means that the disabled student can not move out of the way rapidly if the equipment malfunctions. Therefore, the student must be aware of safety hazards and must be prepared with appropriate protective devices (i.e. safety glasses and face shield).

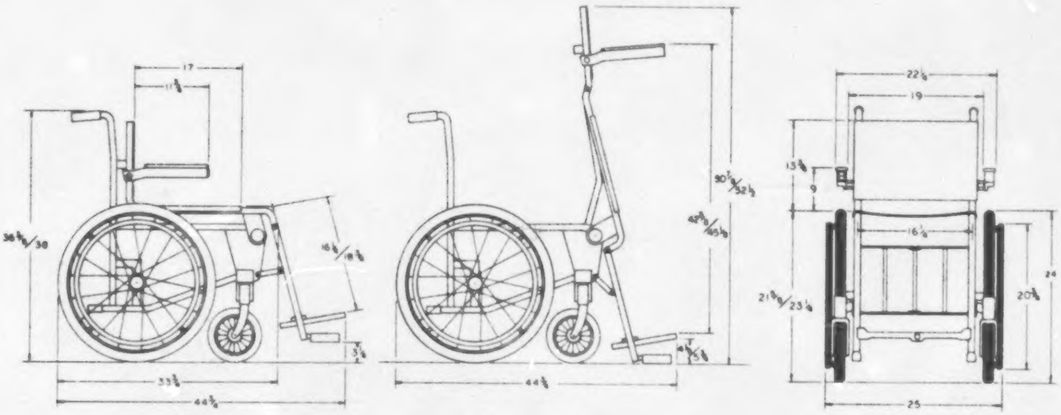


Figure VI-3: The Levo Standup Wheelchair raises the student to a standing position which will increase the range of reach for wheelchair users. To provide stability in the standing position, the foot-rests contact the floor, which may create a potential safety hazard because the student will be unable to move any distance in a hurry.

The Levo chair will not work well for every wheelchair student. For example, a student who has had both legs amputated may not find it readily usable. Other individuals may have physical and/or medical reasons why they can not use the Levo chair. However, there are other innovative wheelchairs, such as the Mainstreaming Evevating Wheelchair, that can increase the mobility and range of reach for many wheelchair students.

The Mainstreaming Elevating Wheelchair (figure VI-3a) utilizes a bucket seat that can be raised or lowered electrically by the operator. This allows the wheelchair student to have mobility throughout a vocational education labatory and to elevate him/herself to standing height, or any fraction thereof, for the purpose of using equipment, tools, etc. The

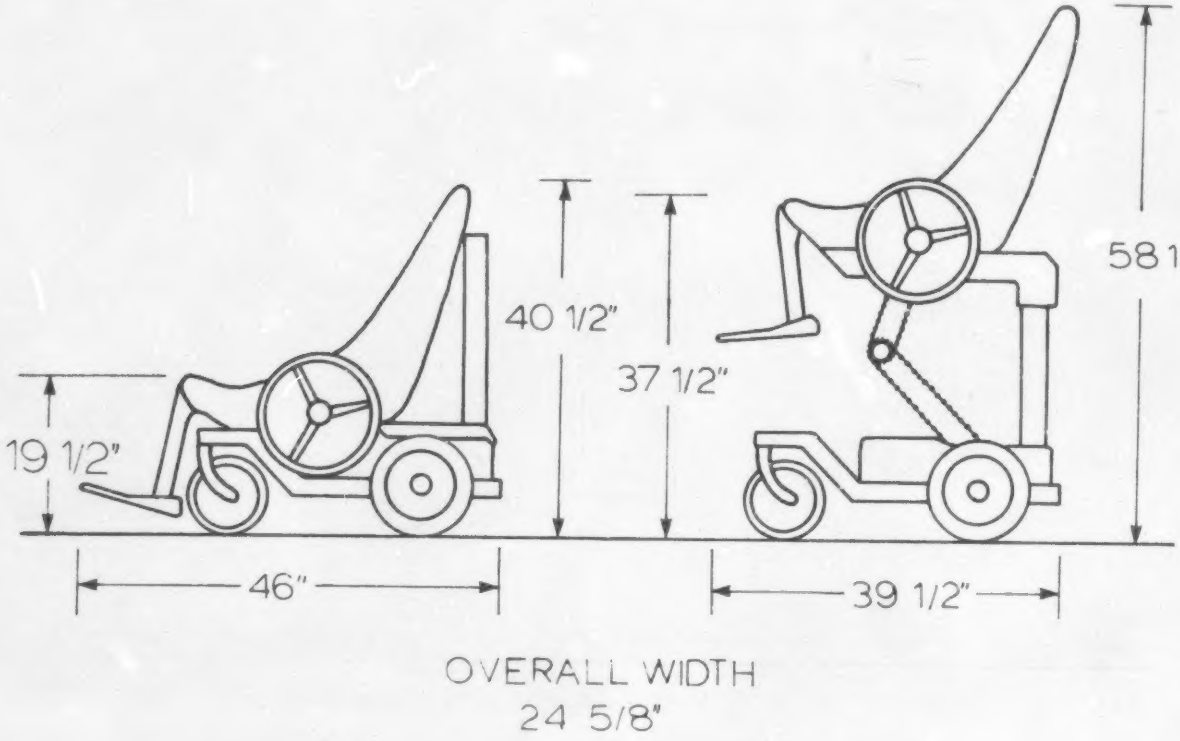


Figure VI-3a: The Mainstreaming Elevating Wheelchair allows the disabled student to raise him/herself to standing height while remining seated.

Mainstreaming chair uses a chain drive for movement forward and backwards. This movement can be made while the chair is in any position in heights, which may make it more applicable for use in vocational education laboratories than the Levo chair. The wheelchair student can move into position to operate equipment after he/she has elevated the chair to the correct working height. Wheelchair technology can open many educational possibilities for the wheelchair student, but be sure to investigate the options before purchasing. Also discuss the options and ramifications with the student's physical therapist, doctor, etc.

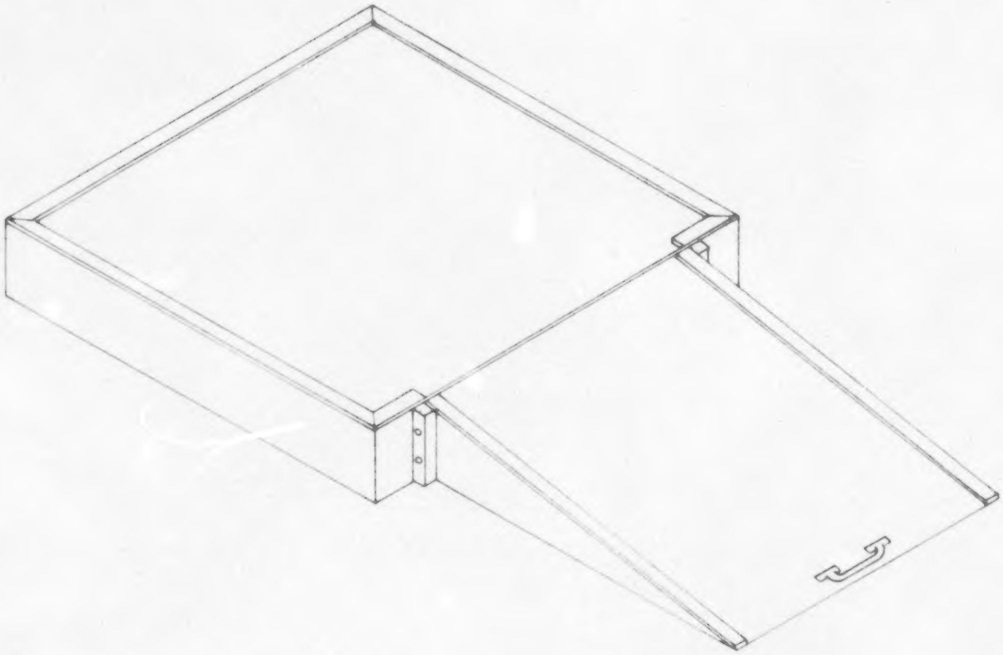


Figure VI-4: A ramp and platform can be constructed to raise a wheelchair student to the appropriate work height. It should be portable and easily storable so it will not hinder the able-bodied student.

When "new" technology is unavailable for some reason, other modifications may be necessary. Most modifications for wheelchair students relate to height and reach. One way to compensate is to build a ramp and platform to raise the student (figure VI-4). This ramp and platform should probably be portable so that it does not impede the able-bodied student.

Other possible modifications include the wheelchair cart designed by Dr. Ken Brunwelheide at Montana State University, Bozman, Montana (figure VI-5). This cart provides height and mobility, and it is fairly inexpensive to

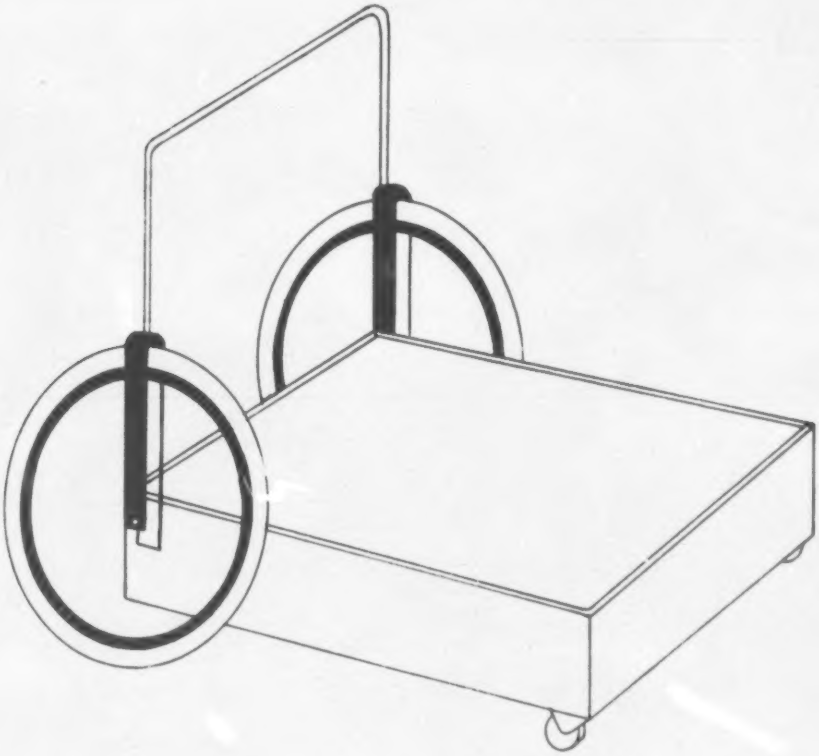


Figure VI-5: The wheelchair cart, used with a ramp for entrance, will allow a wheelchair student height and mobility in vocational education laboratories utilizing their personal wheelchair. This cart was designed and tested by Dr. Kenneth Bruwelheide, Department of Agriculture and Industrial Education, Montana State University, Bozman, Montana 59715.

construct. However, it requires more clear space for turning and moving throughout the lab than the regular wheelchair.

If these alternatives are not practical, then the equipment may need to be modified. For example, a table saw is often too dangerous to use from a sitting position. However, some manufacturers have an option called a "sliding table" which turns the standard table saw into a panel saw. The sliding table attachment has movable clamps to hold the material being cut, and the saw can be operated safely for many types of cuts from a wheelchair. If this type of attachment is not available, perhaps the teacher could construct some type of material holding device. However, it may be safer to go to an alternate piece of equipment such as a small table saw, a portable sabre saw, etc.

The previous example shows the use of the Accessibility to Equipment Model. Because of the wide range in types of equipment in vocational education labs, each instructor will need to apply this model to his/her specific lab and equipment. One excellent way to do this is to borrow a wheelchair, simulate the disabling condition, and try to use the equipment in your lab.

Additional considerations for equipment use by the orthopedically impaired include:

- -- reachers (figure VI-6)
- -- pouch or tray attached to wheelchair to carry small items and tools
- -- locating on-off switches and electric outlets in a reachable position
- -- providing hand controls for foot operated pieces of equipment
- -- provide portable power tools where stationary power tools are not accessible.
- -- a device to hold reading materials (books, plans, recipes, etc.) (figure VI-7).

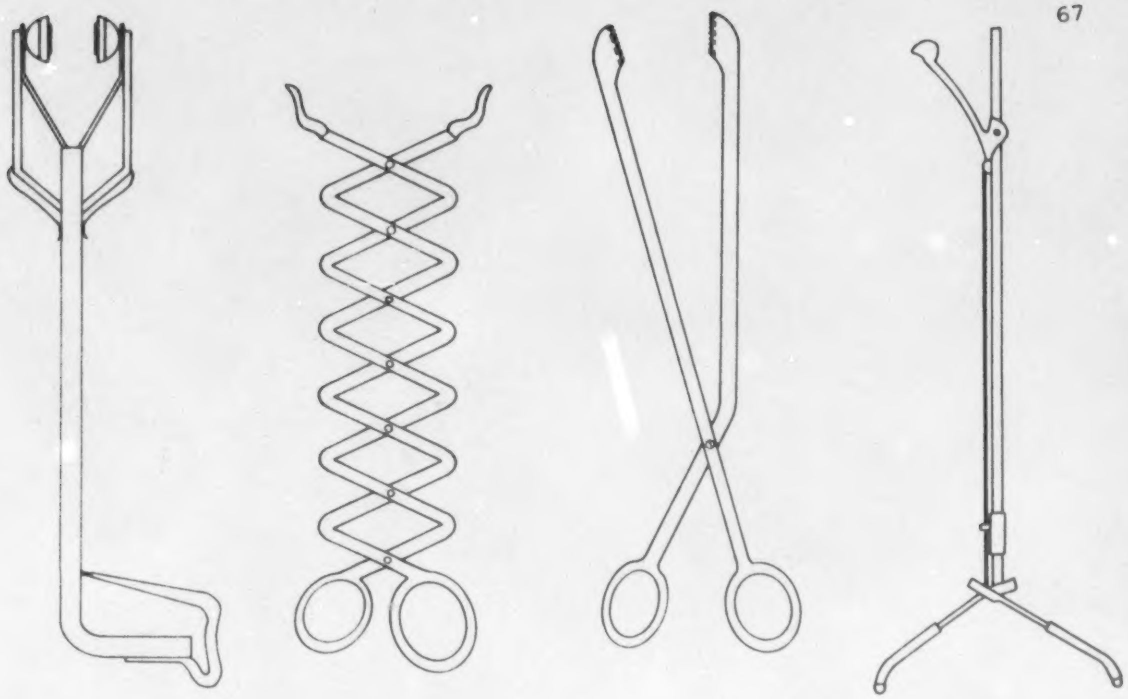


Figure VI-6: Reachers of various designs can be purchased or made to increase the reach of wheelchair students.

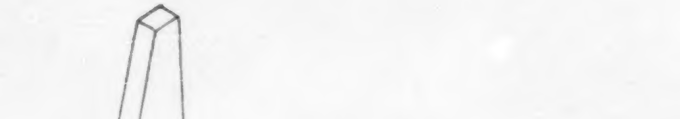


Figure VI-7: Various devices can be purchased or made to hold printed materials for disabled students.

Visually Impaired

Many visually impaired students can use several regular types of equipment with little or no modification. Obviously, pieces of equipment that rely on touch (typewriters, etc.) or that use attachments to hold or guide materials being worked (machine vises, rip fence, etc.) are much easier for the visually impaired student to operate safely and accurately. Equipment and operations that are "free-handed" and rely on a high degree of eye-hand coordination for accuracy (wood lathes, sewing machines, etc.) are more difficult for many of these students to operate (never say *impossible* to operate, as soon as you say it, it is very likely that some person will prove you wrong).

Many specialists in teaching the visually impaired recommend that equipment modifications be kept to a minimum. For example, at the Missouri School for Visually Impaired, St. Louis, Missouri, the equipment in the industrial labs is not modified with extra safety guards and devices that are not provided by the manufacturer. The students are instructed in machine safety and usage and they use the unmodified equipment. The instructor does utilize several jigs and/or fixtures for accuracy. Some of these do increase safety aspects of equipment operation, but that is not the reason for providing them. A similar philosophy is employed at the Illinois School for the Visually Impaired at Jacksonville, Illinois.

However, to use equipment in vocational programs, some special aids are desireable. The blind student will have difficulty measuring, reading meters, reading plans and blueprints, etc. Aids are available such as braille micrometers and rulers, talking meters, talking calculators, raised line drawings, etc. The American Foundation for the Blind has a catalog of such aids that can be purchased and used where appropriate in vocational programs.

There are several other new technology items that are applicable for increasing vocational possibilities for the visually impaired. These include several types of reading machines that transform printed words into tactile patterns or sound (i.e. Optacon, Kurzwell Reading Machine). IBM has developed a "talking" typewriter that can greatly assist the visually impaired in typing and typing occupations. The IBM Audio Typing Unit sounds out each letter as it is typed and it will repeat the line that has been typed upon command. This unit is currently being field tested by IBM. These items, and several computer-related technological advances, will expand the educational and employment possibilities for the visually impaired. However, many of these items are highly sophisticated, not readily available, and very costly. In the mean time, some equipment and program modifications may be in order.

Additional equipment modifications for the visually impaired include:

- foot operated, pressure sensitive switch for machines (i.e. wood lathe, drill press)
- controls that are marked with braille or raised letters (tactile gradations)
- tool trough in workbench top or some type of box or organizer for small tools and materials
- adjustable work lamps for greater illumination (figure VI-8)
- use of dictaphones for presenting "written information in typing and other appropriate class"
- illuminated stand magnifiers

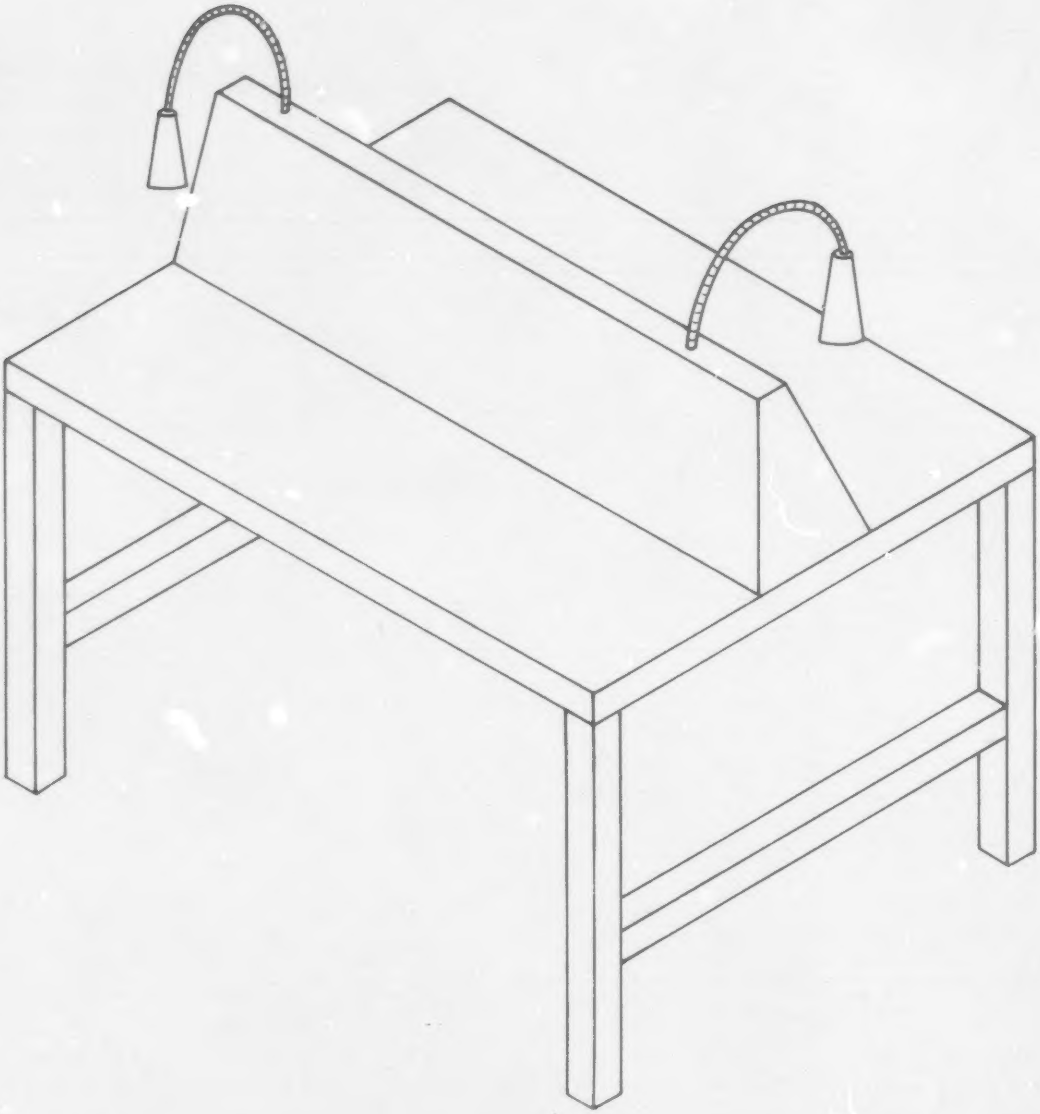


Figure VI-8: An accessible workstation for a visually impaired student might include additional lighting and a tool panel for easy access to tools. A workstation similar to the one illustrated above is currently being utilized at Edward Hine V. A. Hospital in Maywood, Illinois, for visually impaired clients.

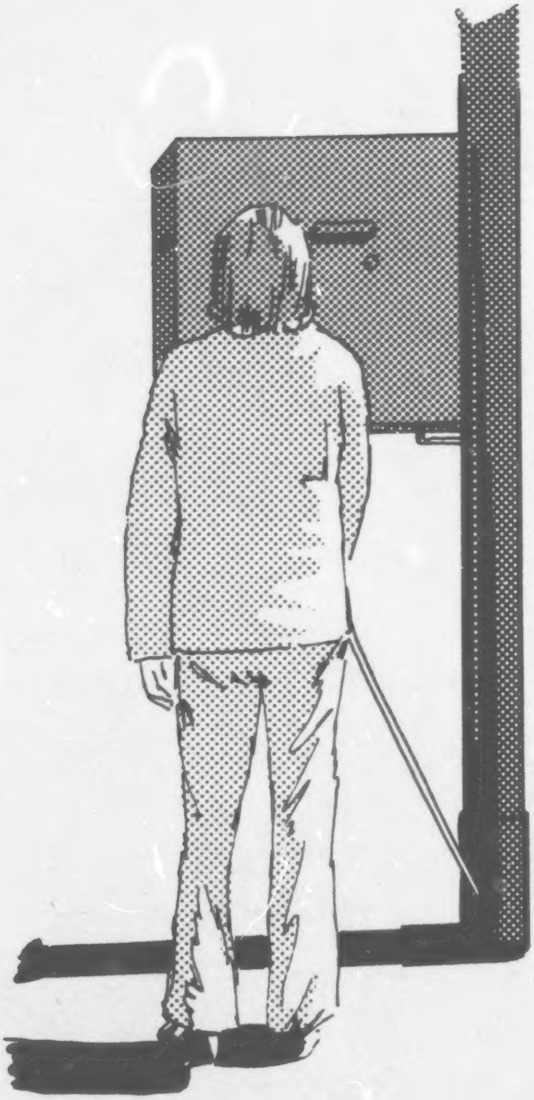


Figure VI-9: Mobility for visually impaired students can be hazardous if items that protrude do not have some identification at the floor level.

Hearing Impaired

Generally, the most serious consequence of a hearing impairment is the loss of verbal communication skills. Therefore, relatively few equipment modifications are required for most of these students to complete a vocational program.

For safety, it is recommended that all equipment have lights that go on when the machine is running. The light serves as a warning to the hearing impaired student. However, a burned out bulb could create a real safety hazard. Similarly, a machine that continues to coast to a stop after the power has been turned off (i.e. a jointer or planer) may be a hazard. The deaf student may assume that the machine is safe because the warning light is off, when in reality a dangerous cutterhead may be coasting.

Other possible modifications include a light that flashes when the return bell rings on a typewriter (figure VI-10). This light indicates that it is time to return the carriage to the left margin. Also, amplification attachments may be required for telephones, dictaphones, etc.

While there are relatively few equipment modifications required for the hearing impaired, there are several teaching techniques that are helpful. Teaching techniques are included in the next section.

TYPEWRITER COPY STAND

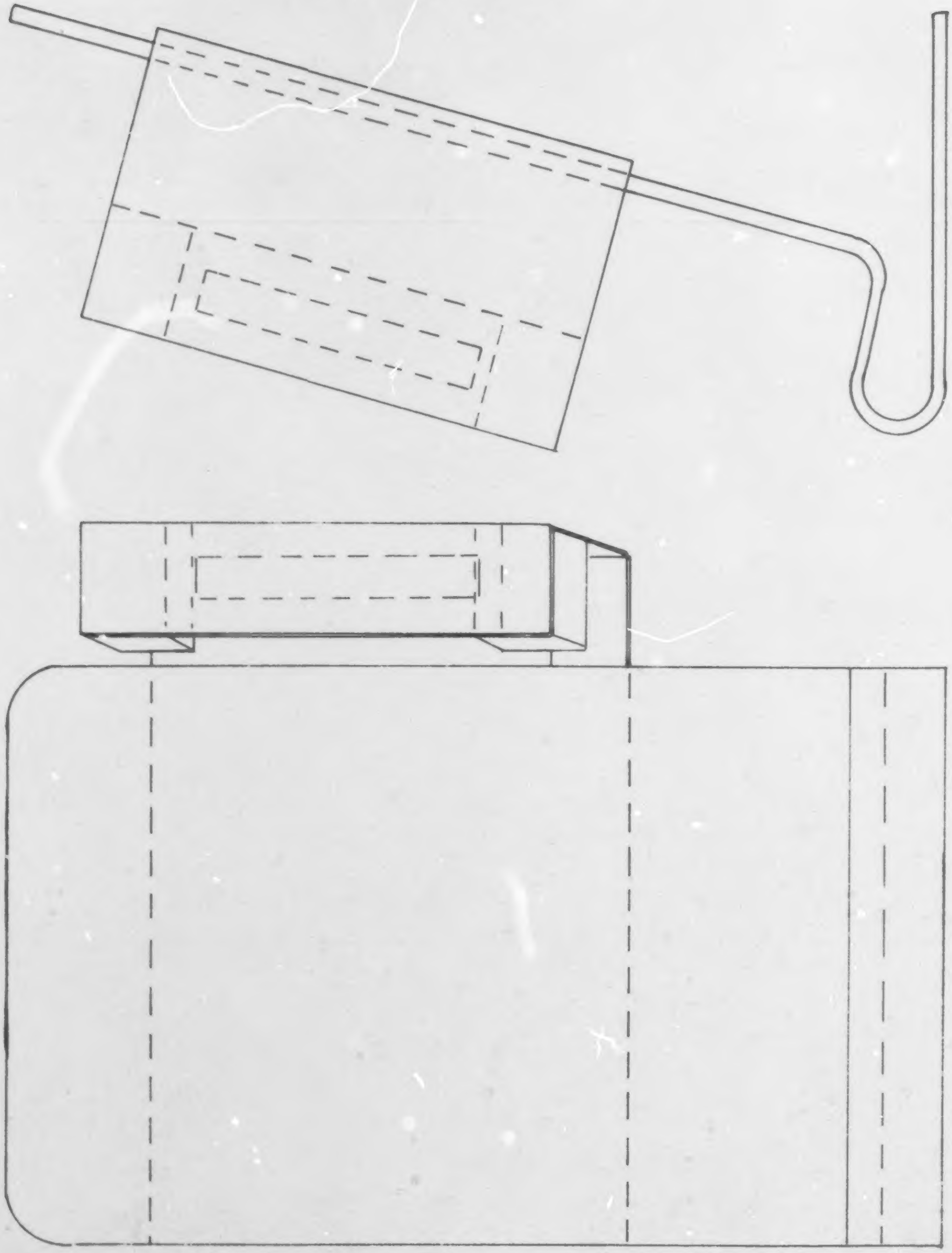


Figure VI-10: A copy stand with strobe light actuated by the typewriter return bell will indicate time to return to the left margin for the hearing impaired. These can easily be constructed (see plans in the resource section of the handbook).

Section VII

TECHNIQUES FOR TEACHING THE PHYSICALLY DISABLED

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Section VII

TECHNIQUES FOR TEACHING THE PHYSICALLY DISABLED

Introduction

Learning to cope with a physical disability involves learning to function effectively, and as normally as possible, in the non-disabled world. This must be borne in mind when discussing adaptive aids for the physically disabled, since there may be a tendency to over-accommodate these persons. Overaccomodation, or unnecessary emphasis on adaptive aids, tends to create an unrealistic environment around disabled persons, which may serve to increase dependence on the adaptive aid rather than increasing self-reliance and personal development. This may in fact limit, rather than improve, the functional ability of physically disabled individuals in the non-disabled world. It must be emphasized, therefore, that only those adaptive aids which are necessary and which emphasize independence and self-reliance are most desirable in a classroom situation.

It must also be re-emphasized that each physically disabled individual is unique in terms of the particular details and characteristics of his or her condition. Each is also unique, therefore, in terms of the adaptive aids and teaching techniques which are appropriate to him or her. Direct consultation with each physically disabled individual is the only way to determine specific accommodations which will be beneficial. The following discussion of teaching techniques for the physically disabled is intended only to be general and descriptive in nature. It should not be seen as a set of definite rules for each and every classroom situation.

For discussion purposes, teaching techniques for the physically disabled can be broadly categorized by the general type of disability to be served. The following discussion will consider four main types of disability: 1) hearing disabilities, 2) visual disabilities, 3) orthopedic disabilities, and 4) disabilities or interruptions of the conscious state. Each of these sections is introduced with a vignette to assist the teacher in understanding the applications of the teaching techniques presented.

Hearing Disabilities

Tim is a student who has been deaf since birth. He does not benefit from a hearing aid. He has very little understandable speech, and is a poor speech reader. He has good manual communication (sign language) skills, and his reading ability--including vocabulary and grammer--is at the fourth grade level. Tim wants to complete a program in horticulture. He will need classes in English, math, speech, and other subjects to complete the requirements for graduation.

-- How might Tim's disability affect his work in school? On his job?

-- Does Tim lack communication skills which could be developed or enhanced through special education or therapy?

-- What physical aids might help Tim in the classroom?

-- If an interpreter is provided, what can be done to help Tim use the interpreter effectively?

-- What modifications might be necessary in a speech or English class to help Tim's educational needs?

-- How would you test Tim's progress in class?

-- How would you test his vocational skills?

-- How would you adapt your teaching techniques so as to maximize communication with Tim in class?

Generally, the most serious consequence of hearing disabilities is the lack of verbal communication skills. Students with hearing disabilities tend to emphasize visual communication as an aid to learning. Most of the teaching techniques mentioned below are intended to facilitate or capitalize on visual ability as an aid to communication in the classroom.

Teaching Techniques.

-- Before classes begin, consult with each hearing-disabled student about adaptive aids which will be helpful to him or her.

-- Learn/develop a set of simple signs, in consultation with hearing-disabled students, which cover basic terms, concepts, or procedures relevant to the course.

-- Arrange for a non-disabled student to provide copies of his or her notes to hearing-disabled students. Speech readers will not be able to look at the instructor and write notes at the same time. This can be done with carbon paper or a xerox copy.

-- Emphasize the use of visual aids in class presentations.

-- Prepare and distribute a glossary of all special or technical terms for the course.

-- If records or tapes are to be used in class, provide hearing-disabled students with written scripts.

-- When new words or terms are introduced in class, spell them out on the chalkboard.

-- Emphasize practical demonstrations and hands-on experience. Always precede abstract concepts with concrete experience.

-- Before giving a demonstration, always go through it verbally first. Speech reading students can't watch the instructor's face and hands at the same time.

-- Repeat in full all questions raised by class members.

-- Speaking a bit slower than normal may aid speechreading students. As a rule, excessive loudness or exaggerated facial or mouth gestures are not helpful.

-- When vital material is covered in class, make sure that hearing-disabled students grasp it by including them in direct questioning on content

-- Never face away from the class (toward the chalkboard, etc.) when speaking.

-- Never stand in front of a window or other light source when speaking.

-- Beards, moustaches, or other whiskers which cover the mouth impede speechreading.

-- For some students, a signing interpreter in class may be necessary.

-- If a signing interpreter is needed, provide one not only in class but also on field trips, etc.

-- Always have the interpreter stand close enough to the instructor so that both can be seen at the same time.

-- Confer with the interpreter ahead of time if new words or terms are to be introduced in class. Allow time in class for finger-spelling these words.

-- Notify the interpreter ahead of time of any presentations (films, etc.) that will require special lighting.

-- Encourage students to remind the instructor of the above aids, in case he or she forgets.

-- Individually consult with hearing-disabled students, and hearing-aid wearers, about which seating is acoustically best for them.

-- Keep classroom doors and windows closed if there is noise outside.

-- Seat speechreading students near the front of the class and remove visual obstructions between them and the instructor.

-- Remember that sudden changes in the environment (i.e., smells, temperature, vibrations) may be distracting to the hearing impaired student.

Visual Disabilities

Alice is a blind student who wants to become a legal secretary. She uses a guide dog to help her get around, and she brings the dog to class with her. She has little residual vision, and reads only braille. She has requested braille copies of all required texts. Since her braille reading rate is only 150 words per minute, she has asked to be notified of all reading assignments at least a week in advance. Alice takes notes in class with a braille stylus and pad. This equipment makes a clicking noise which is distracting to some of the other students in the class.

-- What specific difficulties might Alice encounter as a legal secretary?

-- Is this a good choice of jobs for Alice?

-- Can you suggest modified techniques to help her in routine tasks like keeping appointments, filing, etc.?

-- What adaptive skills or equipment might be helpful to Alice, both in class and on the job?

-- Can you think of adaptations in teaching techniques which might help Alice in class?

-- Is Alice's place in the classroom seating arrangement significant for her? For the other students?

-- How would you test Alice's progress in the course?

-- How would you test her vocational skills?

Visually impaired students tend to rely on the senses of hearing and touch to compensate for lack of visual communication. Studies have indicated that descriptive, verbal explanations alone are often inadequate for teaching practical skills to the visually disabled. Hands-on, touching experience with actual objects and procedures is vital if visually impaired students are to do more than memorize verbal definitions of abstract terms and concepts. It must also be remembered that visually impaired students may have some residual visual ability which can and should be used in the classroom. The accomodations mentioned below are intended primarily to facilitate and capitalize on the senses of hearing, touch, and residual vision as aids to classroom learning.

Teaching Techniques

-- Before classes being, consult with each visually-disabled student about specific adaptive aids which will be helpful to him or her.

-- Arrange for a peer teaching approach which pairs visually disabled students with non-disabled students for completing assignments, etc.

-- Become familiar with reading aids such as the braille system, largeprint materials, and optical reading aids. The instructor should encourage visually disabled students to use such aids, and should make advance arrangements to provide those which are feasible in class.

-- Student reading assistants, who read assigned materials aloud to visually disabled students may be recruited from within the class or from other sources. Encourage and facilitate such arrangements.

-- Since virtually all specially aided reading takes more time than normal non-disabled reading, extra time should be allowed for visually disabled students to complete assigned readings.

-- Class presentations should emphasize auditory communication.

-- Emphasize physical handling of equipment and hands-on experience. Always try to progress from concrete experience to theoretical concepts.

-- Each visually disabled student should be individually oriented to the entire classroom layout and to each piece of machinery or equipment to be used in the course. Each visually disabled student should be promptly informed of any changes in classroom layout.

-- Any visual materials to be handed out in class should be given to visually disabled students well in advance, allowing them to become familiar with these materials ahead of time.

-- Visual materials, especially those which may be legible to partially sighted students, should be simple in design and should not be cluttered with detail or elaborate background.

-- All visual materials used in class should be explained in detail as they are presented.

-- Adequate periods of visual rest should be allowed in class for those students likely to experience eye fatigue as they use residual visual abilities.

-- In classroom discussions, visually disabled students should always be addressed by name.

-- In classroom discussions, the terms "right" and "left" should always refer to the student's right and left side, rather than the instructor's.

-- Consult with each visually disabled student and arrange to seat each student optimally in the room in regards to his or her unique condition.

-- As a rule, a partially sighted student will not wish to be seated so as to face into his or her own shadow.

-- Avoid the use of glossy polished, or plastic coated reading materials or work surfaces which may cause reflected glare and be uncomfortable for visually disabled users.

-- Help each visually disabled student to systematically organize and lay out his or her own work area, materials, and tools.

-- Avoid leaving physical obstacles about in the classroom. All aisles should be kept free. Doors should be kept either fully opened or fully closed.

-- Allow visually disabled students to move about freely in class during presentations and demonstrations in order to maximize visual perception.

-- It may be necessary to provide space in the classroom for guide dogs. It is not generally necessary to call particular attention to this in class, however, if the disabled student desires, a general announcement can be made requesting class members not to pet or talk to the guide dog.

-- All emergency or escape procedures should be rehearsed with each visually disabled student.

-- Adjustable lighting should be available in all work, study, or laboratory areas, allowing either increased or decreased light intensity.

-- Embossed or three-dimensional models and diagrams should be used to explain concepts or procedures which cannot be clearly present by verbal communication.

Orthopedic Disabilities

Jeff is paralized from the waist down and has mobility by using a wheel chair. He has good upper torso control and fine motor skill development. Jeff wants to be a draftsman but the drafting tables in the lab are high, stationary tables that students use by sitting on tall stools. Jeff can not use the drafting tables or machines because of the height. In addition, the tables are so close together that Jeff has difficulty moving around the room.

- -- What modifications need to be made in the equipment to accomodate Jeff?
- -- What modifications need to be made in the arrangement of the room for Jeff?
- -- What other problems may arise for Jeff as he tries to move around in the school building?
- -- How will Jeff be able to meet the physical education requirement for graduation?
- -- Is this an appropriate job selection for Jeff?
- -- How would you test his vocational skills?

Orthopedically disabled persons generally have limited mobility and/or limited manual and motor control skills. Adaptive aids for teaching these individuals are generally intended either to minimize the need for moving about in the classroom, or to facilitate the operation and manipulation of tools and equipment.

Teaching Techniques

- -- Before classes begin, consult with each orthopedically disabled student about adaptive aids which will be helpful to him or her.
- -- Orthopedically disabled students should be allowed and helped to have a dual set of books or texts necessary for the course. One set should be kept in class and one kept in an out of class study area. Space must be provided in the classroom for the in-class books. This will eliminate the need for orthopedically disabled students to carry books to and from class.
- -- Arrangements should be made so that students with impaired note-taking ability can have copies of notes taken by other class members.
- -- Hands-on experience must be emphasized to allow students to become familiar with and practice using tools and equipment.
- -- Patience and a supportive attitdue will help students who have initial difficulty with the correct handling and control of tools and equipment.

-- Use an overhead projector for visual presentations in class. This allows the projection of enlarged images for the entire class, and will allow a display of the student's work (done on overhead transparencies) without the need for standing at the chalkboard.

-- Use a videotape machine with one or more enlarged viewing screens. This allows the presentation of visual materials to the entire class in spite of possible special seating arrangements. Also, class members can re-play videotaped materials outside of class, if necessary.

-- Use overhead pivoting mirrors in presenting demonstrations to the entire class. Students will be able to view demonstrations from different angles without moving about in the classroom.

-- Extra time may need to be allowed for orthopedically disabled students in completing assignments involving manual or motor skills.

-- Some orthopedically disabled students may need to be excused from class early to get across campus to another class.

-- Adjustable, moveable desks and tables will allow for seating and aisle space modifications to ease mobility in the classroom.

-- The classroom floor should have a non-skid surface to aid students who may have difficulty, or need special devices, in walking.

-- Orthopedically disabled students with special mobility, posture, or prosthetic aids may need specially designed seats for classroom work.

-- In-class storage space may be needed for students' orthopedic aids and devices.

-- Ample space should be left open for aisles, between desks, and around all equipment and work areas.

-- Work benches should be adjustable to various heights and depths. In general, wheelchair users will require lower, more recessed benches, tables, and desks.

-- The demonstration table or area should be mobile, so that it can be moved to different areas of the room for maximum visibility or repeat demonstrations.

-- Use peer tutor or teachers aid to individualize instruction.

-- Become familiar with equipment suited for writing or note-taking by students with limited hand or finger control. For example, electric typewriters are available with rest bars or guard plates over the keys for students who cannot operate a regular keyboard accurately. And modified keyboards are available for one-handed use, etc.

Consciousness Disabilities

Judith is an epileptic who occasionally has both grand mal and petit mal seizures. In a grand mal seizure, she falls to the floor, shakes, loses consciousness, and may urinate. During a petit mal seizure, she loses awareness of her surroundings and becomes motionless. Judith usually experiences an aura immediately before the onset of a grand mal seizure. Typically, she has just enough time to stop whatever activity she is engaged in. She is generally unaware of the occurrence of petit mal seizures, and may not realize that she has missed part of a classroom presentation. She is heavily medicated, and often appears to be drowsy. Her seizures are infrequent, but both types have been known to occur in classroom situations. Judith is determined not to let her disability prevent her from living a full life, and she has decided she wants to become an auto mechanic. In the past, school personnel have said they don't think Judith can handle either normal classwork or normal working conditions for a mechanic, but she remains determined to pursue her chosen vocation.

-- How would you cope with a grand mal seizure in class?

-- Is it advisable to discuss seizures and their treatment with the whole class before an occurence?

-- Is auto mechanics a good job choice for Judith? If she demonstrated vocational competence, would you recommend her for employment?

-- What safety precautions might be advisable for her protection in the school auto shop? On the job?

-- How would you compensate for material which Judith may miss in class due to a petit mal seizure?

-- Is Judith likely to need special equipment or facilities in class? On the job?

Students who are, or who may be, disabled by temporary or erratic interruptions of the conscious state require special consideration in the classroom. To help them, an instructor must have 1) a basic understanding of the condition(s) involved (usually epilepsy or diabetes), and 2) a basic knowledge of appropriate aid in case of a seizure or attack. Since it is likely that other students will observe seizures or attacks which occur in class, the instructor must assist them by sharing his understanding and knowledge of the condition(s) with them. If an epileptic student is to be mentioned by name rather than a general discussion of seizures, be sure to get the student's permission first. Students who have this type of disability must be encouraged to consult with the instructor before course work begins, or early in the course, to allow for adequate advance preparation. The following material is intended to provide a basic understanding of the conditions of epilepsy and diabetes, and a basic knowledge of the appropriate aid in case of an epileptic seizure or an insulin reaction.

Teaching Techniques

-- Be informed of the possibility of seizures or consciousness interruptions and must be aware of the condition involved. The disabled student should discuss this with the instructor before classes begin.

-- Be aware of and alert to possible symptoms or warning signs of an impending change in consciousness, and be able to recognize an epileptic seizure or insulin reaction in process.

-- Be prepared to cope with a seizure or attack by rendering appropriate aid in the classroom.

-- A frank, sensible discussion of the conditions and treatments of these disabling conditions with all class members will ease the handling of a seizure in class. The attitude and manner of the instructor will set the tone for the rest of the class.

-- It may be necessary to arrange extra study time both in and out of class for students whose study has been interrupted by seizures.

-- Have access to a telephone and also have the phone number of a competent physician in case of an emergency which requires medical aid.

- Emergency supplies, such as soft cushions or pillows for grand mal epileptic seizures, or sugar dosages for diabetic insulin reactions, should be available in the classroom.
- Often, persons who undergo a seizure or insulin reaction will need to rest or sleep afterwards. A quiet, private area should be readily available for this, either in or near the classroom.
- Ample space must be left around desks, work areas, and equipment in case of the sudden onset of a seizure or reaction while these facilities are being used.
- Always be on hand to render aid and help prevent injury to disabled individuals during seizures.
- As a rule, no further modifications need to be made for the use of equipment or tools by consciousness disabled individuals in the classroom.

First Aid - Epilepsy

Epileptic seizures vary in characteristics and intensity, and appropriate aid varies with the type of seizure. Often, an epileptic person will sense an aura, a general feeling of anticipation, just before a seizure begins. If recognized, this can allow some advance preparation before the onset of the seizure.

Description. Petit mal seizures usually do not involve convulsions or other loss of motor control. Rather, they are characterized by fleeting lapses of consciousness which may be indicated by a blank stare or flickering of the eyes. These seizures usually last only a matter of seconds and they may occur literally hundreds of times in a day. When they are over the affected person resumes normal activity. Often, the affected person is completely unaware of the occurrence of the seizure. Extremely mild or infrequent petit mal seizures may be mistaken for inattentiveness or daydreaming, and in some cases the condition of epilepsy may remain undiagnosed and untreated.

As a rule, no medical aid is required at the occurrence of a petit mal seizure. However, the instructor should be prepared to recognize and observe the symptoms, to time the duration of the seizure and to report the occurrence accurately to a physician.

Some epileptic seizures involve a significant change in motor control and conscious state without causing a complete loss of bodily and mental functions. These are called psychomotor seizures. Persons undergoing such seizures may talk unintelligibly or exhibit unnatural or inappropriate behavior. Some may wander during the seizure. Psychomotor seizures generally last anywhere from several seconds to several hours. Extreme cases may last for days. After psychomotor seizures, affected persons may resume normal functioning, or they may feel disoriented and distressed and desire to rest or sleep.

Again, no medical aid need be offered psychomotor seizures. No effort should be made to interrupt the seizure or restrain the symptoms. If the affected person wanders, he or she should be accompanied and protected from injury. Details of the seizure, including the symptoms and duration, should be noted and reported to a physician.

Grand mal seizures typically involve loss of consciousness and motor control, and frequently cause convulsions. Later in the seizure, the body becomes limp. Grand mal seizures may be accompanied by excess salivation and loss of bladder or bowel control. The convulsing individual may appear to have difficulty breathing, but this is no cause for alarm. A typical grand mal seizure will not last for more than 10 minutes, and it will not be followed immediately by another seizure. For treatment of exceptions to this, see "status epileptics" below. After a grand mal seizure, affected persons may experience headaches, drowsiness, and incoordination. They may feel disoriented and should be allowed to rest.

No physical restraint should be placed on a person undergoing a grand mal seizure. Nothing should be forced between the teeth, and liquids should not be given. A pillow or cushion may be placed under the head to avoid injury, and hard, sharp, or hot objects should be cleared from the area. After the seizure, the head and body of the affected person can be turned to one side to aid in breathing. Symptoms and details of the seizure--including duration, changes in temperature, etc.--should be noted and reported to a physician.

In the case of a grand mal seizure which lasts longer than about 10 minutes, or which is followed immediately by another seizure, there is a danger that the affected person may enter a fixed state of seizure called status epilepticus. This constitutes a medical emergency, and emergency aid should be summoned immediately. Pending arrival of emergency aid, administer the same care as indicated for a grand mal seizure above.

First Aid - Diabetes

When a diabetic person's blood sugar level sinks too low, an insulin reaction may occur. Such things as inadequate medication, unusually strenuous physical exertion, or eating too little can contribute to the imbalance of insulin in the body which causes this state. The symptoms of an insulin reaction vary among individuals. They may include a change in mood such as irritability or confusion; feelings of drowsiness, faintness, dizziness, hunger, or nausea; trembling, sweating, or headaches; tingling sensations or blurred vision; or perhaps loss of consciousness.

At the first appearance of symptoms of an insulin reaction, sugar should be given to the affected person. It can be offered in a number of convenient forms, including raw sugar (in cubes, packets, or spoonfuls), fruit juice, carbonated beverages (not diet or unsweetened), and candy bars. The affected person should feel improvement in 15 to 20 minutes. He or she should then eat a little food, such as a sandwich and some milk, and then normal activity can be resumed. If no improvement results after the first dosage of sugar, a second dosage should be given. If no improvement results after the second dosage, a physician should be notified.

Section VIII

RESOURCES

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RESOURCES

Resources to assist in making buildings, laboratories, and programs accessible to the physically disabled are included in this section. The resources are listed as materials in print, organizations, equipment suppliers, public agencies, and illustrations of accessibility items/ modifications.

Materials in Print

Aiello, B. *Places and Spaces: Facilities Planning for Handicapped Children*. Reston, Virginia: Council for Exceptional Children, 1920 Association Drive, 1976. (ERIC Reference: ED 123 838)

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Organizations

Alexander Graham Bell Association for the Deaf, Inc.
3417 Volta Place N.W.
Washington, D.C. 20007
(202) 337-5220

American Council of the Blind, Inc.
501 North Douglas Avenue
Oklahoma City, OK 73106
(405) 232-4644

American Diabetes Association, Inc.
1 West 48th Street
New York, NY 10020
(212) 541-4310

American Foundation for the Blind
15 West 16th Street
New York, NY 10011
(212) 924-0420

American Printing House for the Blind
P.O. Box 6085
1839 Frankfort Avenue
Louisville, KY 40206
(502) 895-2405

Architectural and Transportation Barriers Compliance Board
Mary E. Switzer Building, Room 1010
330 C. Street, S.W.
Washington, D.C. 20201
Public Information Office (202) 245-1591

Association for Education of the Visually Handicapped
919 Walnut Street
Philadelphia, PA 19107
(215) 923-7555

Council for Exceptional Children
1920 Association Drive
Reston, VA 22091
(703) 620-3660 (800) 336-3728

Epilepsy Foundation of America
1828 L Street, N.W. Suite 406
Washington, D.C. 20036
Advocacy and Client Referral (202) 293-2930

Materials Development Center
Stout Vocational Rehabilitation Institute
Menomonie, WI 54751
MDC Information Service (715) 232-1342

Muscular Dystrophy Association, Inc.
810 7th Avenue
New York, NY 10019
Director of Patient and Community Services
(212) 586-0808

National Amputation Foundation, Inc.
12-45 150th Street
Whitestone, NY 11357
Executive Secretary (202) 767-0596

National Association for Visually Handicapped
305 East 24th Street, 17-C
New York, NY
(212) 889-3141

National Association of the Deaf
814 Thayer Avenue
Silver Springs, MD 20910
Public Information Officer (302) 587-1788

National Association of the Physically Handicapped, Inc.
76 Elm Street
London, OH 43140

National Center for a Barrier Free Environment
8401 Connecticut Avenue N.W.
Washington, D.C. 20015
(703) 620-2731

National Center for Law and the Handicapped, Inc.
1235 North Eddy Street
South Bend, IN 46617
(219) 288-4751

National Center, Educational Media and Materials for the Handicapped (NCEMMH)
Ohio State University
Columbus, OH 43210
(614) 422-7596

National Easter Seal Society for Crippled Children and Adults
2033 West Ogden Avenue
Chicago, IL 60612
Information Center (312) 243-8400

National Federation of the Blind
218 Randolph Hotel Building
Des Moines, IA 50309
(515) 243-3169

National Foundation--March of Dimes
1275 Mamaroneck Avenue
White Plains, NY 10605
(914) 428-7100

National Institute for Rehabilitation Engineering
97 Decker Road
Butler, NJ 07405
Technical Director (201) 838-2500

National Multiple Sclerosis Society
205 East 42nd Street
New York, NY 10017
(212) 532-3060

National Paraplegia Foundation
333 North Michigan Avenue
Chicago, IL 60601
(312) 346-4779

National Society for the Prevention of Blindness, Inc.
79 Madison Avenue
New York, NY 10016
Information and Referral Specialist
(212) 684-3505

President's Committee on Employment of the Handicapped
Washington, D.C. 20210
Office of Information
(202) 653-5010

Recording for the Blind, Inc.
215 East 58th Street
New York, NY 10022
Circulation Department (212) 751-0860

St. Paul Technical Vocational Institute
235 Marshall Avenue
St. Paul, MN 55102
Program for Deaf Students
(612) 227-9121

Spina Bifida Association of America
343 South Dearborn, Suite 319
Chicago, IL 60614
Information and Referral Department
(312) 663-1562

United Cerebral Palsy Associations, Inc.
66 East 34th Street
New York, NY 10016
Director of Program Services
(212 481-6350

Equipment Suppliers

American Foundation for the Blind
15 West 16th Street
New York, NY 10011
(212) 924-0420

Fred Samons, Inc.
Box 32
Brookfield, IL 60513

R. J. Mobility Systems and Conversion Specialists
715 South 5th Avenue
Maywood, IL 60153
(312) 344-2705
- Distributor for:
  Levo Standup Wheelchair
  Mainstreaming Elevating Wheelchair

Telesensory Systems, Inc.
3408 Hillview Avenue
Palo Alto, CA 94304
(415) 493-2626
- Dave Witter, Midwest Representative
  1624 Timber Trail
  Wheaton, IL 60187

Typewriting Institute for the Handicapped
3102 West Augusta Avenue
Phoenix, AZ 95021

Illinois Bell Telephone
Communications Center for the Disabled
225 W. Randolph St.
Chicago, IL 60606

PUBLIC AGENCIES

There are several agencies in the public sector that provide services and/or funds for the physically handicapped. The following agencies and personnel are listed to assit in identifying the maximum resources available to local educational agencies for making vocational education laboratories and equipment accessible to the physically handicapped.

VOCATIONAL EDUCATION

Illinois State Board of Education
Department of Adult, Vocational and Technical Education
100 North First Street
Springfield, IL 62777

Consultant Services Unit
Louise Dailey, Manager
217-782-4877

Special Needs Consultants

Sharon Full
Consultant Services Unit
Department of Adult, Vocational
and Technical Education
Illinois State Board of Education
100 North First Street
Springfield, IL 62777
217-782-4877

Margret Brewner
School District U46
4 South Gifford
Elgin, IL 60120
312-888-5358

Barb Neisendorf
Waubonsee Community College
Building D, Room 210
Route 47 at Harter Road
Sugar Grove, IL 60554
312-466-4811, ext. 245

Jack Rawlinson
603 West Main
Crossville, IL 62827
618-966-2134

Kathy Roach
Western Illinois University
Department of Special Education
Horrabin Hall
Macomb, IL 61455
309-298-1932

Marshall Skinner
Bloomington Area Vocational Center
1202 East Locust Street
Bloomington, IL 61701
309-827-6124

Terry Tosh
Bloomington Area Vocational Center
1202 East Locust Street
Bloomington, IL 61701
309-827-6124

Special Education

Illinois State Board of Education
Department of Specialized Educational Services
100 North First Street
Springfield, IL 62777

Program Development Unit
Gloria Calovini, Manager
217-782-6601

Special Education Specialists - Program Design

Loree Riggs
Specialized Educational Service/
Vocational Education Liaison

Gail Lee
Visually Impaired
Deaf/Blind

Tarrell Bourret
Orthopedically Impaired
Hearing Impaired

Special Education Regional Programs - Title I, 89-313

There are thirteen regional programs that coordinate/deliver services and/or funds for low incidence handicapped populations. The directors of these regional programs are listed and a map deliniating the regional boundries is included.

Robert Van Dyke
Director
South Metropolitan Association
250 West Sibley Boulevard
Dolton Post Office
Harvey, IL 60426
312-841-7800

Wendell Jones
Director
DuPage/West Cook Regional Special
Education Association
1 South 331 Grace Street
Lombard, IL 60148
312-629-7272

Dr. Petra Harris
Director
Chicago Board of Education
228 North LaSalle Street
Chicago, IL
312-641-4138

Ida Grotto
Director
Area Services Program
799 Roosevelt Road
Building 4, Suite 14
Glen Ellyn, IL 60137
312-469-5143

Myron Dagley
Director
Low Incidence Cooperative
Association
8257 Harrison Street
Nile, IL 60648
312-679-7994

Gary Lieder
Director
Lake-McHenry Regional Program
394 Peterson Road
Libertyville, IL 60048
312-367-4300

Jerry Maring
Director
Northwestern Illinois Association
145 Fisk Avenue
DeKalb, IL 60115
815-758-0636

William Ott
Director
Regional Educational Service
Agency
420 North Raynor Avenue
Joliet, IL 60435
815-740-3135

Dr. Harold Berjohn
Director
West Central Regional Education
Service Center
3202 North Wisconsin Avenue
Peoria, IL 61603
309-672-6717

Dr. Robert D. Bowen
Director
Western Illinois Association
323 West Washington
Macomb, IL 61455
309-837-3911

Stephen Tilton
Director
East Central Regional Program
354 West Main Street
Decatur, IL 62522
217-429-0650

Stanley Nelson
Director
West Central Association
730 East Vine Street
Springfield, Il 62703
217-525-3022

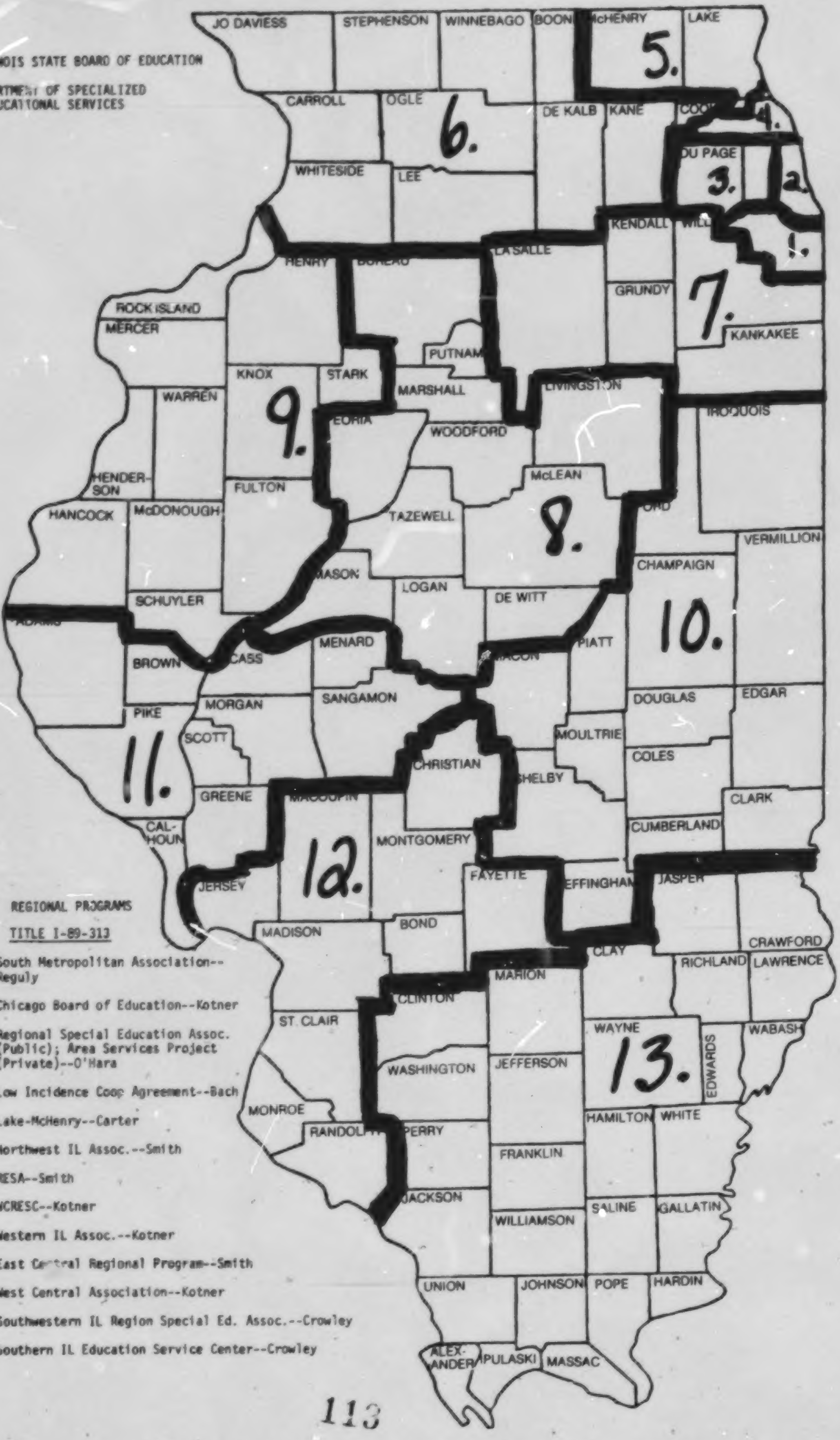
Dr. Wayne Reinking
Director
Southwest Illinois Regional Special
Education Association
1826 Jerome Lane
Cahokia, IL 62206
618-332-6576

Larry Goldsmith
Director
Southern Illinois Educational Service
Center
908 First Avenue
Lincoln Square
Marion, IL 62959
618-997-3434

Because the services provided by the low incidence cooperatives varies to some extent, a listing of the special education directors and local cooperatives is included as follows. These local cooperatives and directors may be able to assist in providing and/or identifying resources for including the physically impaired in vocational education.

ILLINOIS STATE BOARD OF EDUCATION

DEPARTMENT OF SPECIALIZED
EDUCATIONAL SERVICES


JO DAVIESS
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BOONE
McHENRY
LAKE
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COOK
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DU PAGE
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BUREAU
LA SALLE
ROCK ISLAND
MERCER
GRUNDY
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KANKAKEE
PUTNAM
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STARK
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IROQUOIS
WARREN
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PEORIA
WOODFORD
HENDERSON
McLEAN
FULTON
HANCOCK
McDONOUGH
TAZEWELL
8.
FORD
VERMILLION
MASON
CHAMPAIGN
SCHUYLER
LOGAN
DE WITT
ADAMS
10.
MENARD
PIATT
BROWN
CASS
MACON
MORGAN
SANGAMON
DOUGLAS
EDGAR
PIKE
SCOTT
MOULTRIE
11.
CHRISTIAN
COLES
SHELBY
GREENE
MACOUPIN
CLARK
CALHOUN
MONTGOMERY
CUMBERLAND
12.
JERSEY
FAYETTE
EFFINGHAM
JASPER
MADISON
BOND
CRAWFORD
CLAY
RICHLAND
LAWRENCE
MARION
CLINTON
ST. CLAIR
WAYNE
WABASH
WASHINGTON
JEFFERSON
13.
EDWARDS
MONROE
HAMILTON
WHITE
RANDOLPH
PERRY
FRANKLIN
JACKSON
SALINE
GALLATIN
WILLIAMSON
UNION
JOHNSON
POPE
HARDIN
ALEXANDER
PULASKI
MASSAC

REGIONAL PROGRAMS

TITLE I-89-313

1. South Metropolitan Association--Reguly
2. Chicago Board of Education--Kotner
3. Regional Special Education Assoc. (Public); Area Services Project (Private)--O'Hara
4. Low Incidence Coop Agreement--Bach
5. Lake-McHenry--Carter
6. Northwest IL Assoc.--Smith
7. RESA--Smith
8. WCRESC--Kotner
9. Western IL Assoc.--Kotner
10. East Central Regional Program--Smith
11. West Central Association--Kotner
12. Southwestern IL Region Special Ed. Assoc.--Crowley
13. Southern IL Education Service Center--Crowley

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DIRECTORY LISTING OF SPECIALIZED EDUCATIONAL SERVICES ADMINISTRATORS
1980-81

	NAME AND ADDRESS	COUNTY OR COUNTIES
1.	Addison, Wayne James Education Center 2512 Amelia Street Alton, IL 62002 Telephone: 618/463-2121	Madison
2.	Amstutz, Richard Livingston County Special Services Unit 310 Torrance Avenue Pontiac, IL 61764 Telephone: 815/844-7115	Livingston
3.	Aschenbrenner, Charles L. Sangamon Area Special Education District 2201 Toronto Road Springfield, IL 62707 Telephone: 217/786-3250	Sangamon Cass Macoupin Menard
4.	Aucutt, Janet Perandoe Special Education District 112 Locust Post Office Box 169 Red Bud, IL 62278 Telephone: 618/282-6251 618/282-6252	Randolph Monroe
5.	Babich, William 201 East Jefferson Street Joliet, IL 60432 Telephone: 815/727-6986 815/727-6987	Will
6.	Balen, Steven Madison, Jersey and Macoupin Counties Special Education District Region III 1800 Storey Lane Cottage Hills, IL 62018 Telephone: 618/462-1031	Macoupin Jersey Madison
7.	Batts, Donald D. Mid-State Special Education Joint Agreement Taylorville High School 815 Springfield Road Taylorville, IL Telephone: 217/824-8121	Christian Bond Fayette
8.	Bergagna, James Northwest Special Education District 1205 South Chicago Avenue Freeport, IL 61032 Telephone: 815/232-5911	Stephenson Carroll Jo Daviess

	NAME AND ADDRESS	COUNTY OR COUNTIES
9.	Berghult, Jan L. Henry-Stark County Special Education District 600 North Lexington Avenue Post Office Box 597 Kawanee, IL 61443 Telephone: 309/852-5696	Henry Bureau 3070 Stark
10.	Beyer, Dallas E. Macon-Piatt Special Education District 101 East Cerro Gordo Street Decatur IL 62523 Telephone: 217/424-3025	Macon Piatt
11.	Blackman, Dr. Howard LaGrange Area Department of Special Education (LADSE) 1301 West Cossitt Avenue LaGrange, IL 60525 Telephone: 312/354-5730	Cook DuPage
12.	Bocke, Dr. Joseph Special Education Association of Adams County 640 Jersey Street Quincy, IL 62301 Telephone: 217/222-3280	Adams
13.	Bowers, Dr. Norman E. 1314 Ridge Avenue Evanston, IL 60201 Telephone: 312/492-5864	Cook
14.	Bowyer, Dianne 80 South River Street Aurora, IL 60506 Telephone: 312/844-4400	Kane
15.	Brandt, E. Caydon Maine Township Special Education Program (MTSEP) 1131 South Dee Road Park Ridge, IL 60068 Telephone: 312/696-3600	Cook
16.	Braun, Dr. Benjamin L. Southwest Cook County Cooperative Association for Special Education 6020 West 151st Street Oak Forest, IL 60452	Cook
17.	Bristol, Dr. Stanley T. Northern Suburban Special Education District (NSSED) Stratford Center 760 Red Oak Lane Highland Park, IL 60035 Telephone: 312/831-5100	Lake Cook

	NAME AND ADDRESS	COUNTY OR COUNTIES
18.	Burgener, Harry J. Cahokia Area Joint Agreement Special Education 1700 Jerome Lane Cahokia, IL 62206 Telephone: 618/332-1333	St. Clair
19.	Calvin, Dr. Howard T. Tazewell-Mason Counties Special Education Association 15 South Capitol Pekin, IL 61554 Telephone: 309/347-5164	Tazewell Mason
20.	Carr, Lorrie 7925 North 2nd Rockford, IL 61111 Telephone: 815/633-4353	Winnebago
21.	Carstens, James L. Bi-County Special Education Cooperative 643 Genesee Avenue Morrison, IL 61270 Telephone: 815/772-4053	Whiteside Carroll
22.	Conway, Clint Lee County Special Education Association Eldena School RR #4 Dixon, IL 61021 Telephone: 815/284-6651	Lee
23.	Coverdill, Joseph Romeoville Special Education District 636 Dalhart Avenue Romeoville, IL 60441 Telephone: 815/886-2700, Ext. 502	Will
24.	Dease, E. Richard Cooperative Association for Special Education (CASE) 1464 South Main Street Lombard, IL 60148 Telephone: 312/932-8222	DuPage
25.	Dew, Larry Madison County Special Education Region I 2060c Delmar Avenue Granite City, IL 62040 Telephone: 618/876-4900	Madison
26.	Dougherty, James Michael Woodford County Special Education Association 815 East Chatham Metamora, IL 61548 Telephone: 309/367-4018	Woodford

	NAME AND ADDRESS	COUNTY OR COUNTIES
27.	Dremann, Gordon G. Ford-Iroquois County Special Education Association Post Office Box 216 Elliott, IL 60933 Telephone: 217/749-2323	Ford Iroquois
28.	Eggertsen, Dane Lincoln Land Special Education Systems Department of Corrections Juvenile Division 426 South 5th Street Springfield, IL 62701 Telephone: 217/785-1460	Sangamon (Statewide)
29.	Falk, Howard Eisenhower Cooperative District 128 Indian Hill School 12812 South Austin Avenue Palos Heights, IL 60463 Telephone: 312/385-1220	Cook
30.	Farrimond, Dr. Donald Knox-Warren Special Education District 1014 South Farnham Street Galesburg, IL 61401 Telephone: 309/343-2143	Knox Warren
31.	Fogle, Carl Dean Belleville Area Special Education District 1404 East Main Street Belleville, IL 62221 Telephone: 618/234-1553	St. Clair
32.	Frazee, Dr. Vernon F. Niles Township Department of Special Education 6950 East Prairie Road Lincolnwood, IL 60645 Telephone: 312/675-8625	Cook
33.	Gabriel, Martin City of Chicago 228 North LaSalle Street Chicago, IL 60601 Telephone: 312/641-4138	Cook
34.	Gillet, Dr. Pamela Alice Northwest Suburban Special Education Organization (NSSEO) 500 South Plum Grove Road Palatine, IL 60067 Telephone: 312/359-2110	Cook

	NAME AND ADDRESS	COUNTY OR COUNTIES
35.	Glassford, F.E. (Joe) Wabash and Ohio Valley Special Education District Post Office Box E Norris City, IL 68269 Telephone: 618/378-2131	White Edwards Gallatin Hamilton Hardin Pope Saline Wabash Wayne
36.	Gray, Dr. Aaron G. 3202 North Wisconsin Avenue Peoria, IL 61603 Telephone: 309/672-6777	Peoria
37.	Grewell, Donald R. Eastern Illinois Area of Special Education (EIASE) 112 North 22nd Street Mattoon, IL 61938 Telephone: 217/235-0551	Coles Clark Cumberland Douglas Edgar Effingham Moultrie Shelby
38.	Hampleman, Claude Kaskaskia Special Education District 211½ South Locust Centralia, IL 62801 Telephone: 618/532-4721	Clinton Marion Washington
39.	Handley, Jack Vermilion Association of Special Education 516 North Jackson Street Danville, IL 61832 Telephone: 217/443-2900, Ext. 231	Vermilion
40.	Hansen, Robert B. 405 North Sixth Street Dundee, IL 60018 Telephone: 312/426-1346	Kane
41.	Holt, Dr. Joseph Special Education District of Franklin and Jefferson Counties Eighth and Jordan Mt. Vernon, IL 62864	Jefferson Franklin
42.	Holverson, James Boon County Special Education Cooperative 1031 - 5th Avenue Washington School Belvidere, IL 61008 Telephone: 815/544-9851	Boone

	NAME AND ADDRESS	COUNTY OR COUNTIES
43.	Hurd, Daniel S. School Association for Special Education in DuPage (SASED) 421 North County Farm Road Wheaton, IL 60187 Telephone: 312/653-5535	DuPage
44.	Johnson, Virginia Lee Kendall County Special Education Cooperative 800 South West Street Plano, IL 60545 Telephone: 312/552-4121	Kendall
45.	Keller, Arthur Kankakee Area Special Education Cooperative Post Office Box 339-A R.R. #7 Kankakee, IL 60901 Telephone: 815/939-3651	Kankakee Iroquois 0040
46.	Kessler, Dr. Harold Tri-County Special Education Association 201 West Olive Street, Suite 201 Bloomington, IL 61701 Telephone: 309/828-5231	McLean DeWitt Logan
47.	Kinert, Martin 420 North Raynor Avenue Joliet, IL 60435 Telephone: 815/740-3196	Will
48.	Lamb, Barry Special Education District of McHenry County (SEDOM) 1200 Dane Street Woodstock, IL 60098 Telephone: 815/338-3622	McHenry
49.	Lamb, Charles Ogle County Education Cooperative 105 West Lincoln Street Mt. Morris, IL 61054 Telephone: 815/734-6071	Ogle
50.	Leach, Robert Four Rivers Special Education District Norris Building 446 East State Street Jacksonville, IL 62650 Telephone: 217/245-7174	Morgan Brown Calhoun Cass 0150 Greene Macoupin 0020 Pike Sangamon 0160 Scott

NAME AND ADDRESS	COUNTY OR COUNTIES
51. Lilyfors, Dr. Arthur Dale Rural Champaign County Special Education Cooperative 216½ South First Street Champaign, IL 61820 Telephone: 217/356-5167 217/356-6485	Champaign
52. Loken, Dr. Mary F. 1900 West Monroe Street Springfield, IL 62704 Telephone: 217/525-3018	Sangamon
53. Lukas, John East DuPage Special Education District (EDSED) 502 East Van Buren Villa Park, IL 60181 Telephone: 312/279-4725	DuPage
54. McCracken, Dr. Sarah West Suburban Association for Special Education (WSASE) 1125 South Cuyler Oak Park, IL 60304 Telephone: 312/524-1196	Cook
55. Mac Gregor, Neil E. Argo, Evergreen Park, Reavis, Oak Lawn Area Department of Special Education (AERO) 7600 South Mason Avenue Burbank, IL 60459 Telephone: 312/469-3330	Cook
56. Mackay, Martin P. Lincoln-Way Area Special Education Colorado & Willow Streets Frankfort, IL 60423 Telephone: 815/469-2415	Will
57. Mahan, Dr. Guy H. Leyden Area Cooperative for Special Education 10401 West Grand Avenue Franklin Park, IL 60131 Telephone: 312/455-3143	Cook
58. Melican, Donald E. Post Office Box 249 300 East Monroe Street Bloomington, Il 61701 Telephone: 309/827-6031	McLean

	NAME AND ADDRESS	COUNTY OR COUNTIES
59.	Miller, Judy Kay Bureau-Marshall-Putnam Tri-County Special Education Cooperative 530 Park Avenue East (Perry Memorial Hospital) Princeton, IL 61356 Telephone: 815/875-2645	Bureau Marshall Putnam 5340
60.	Napier, Arvin Johnson, Alexander Massac and Pulaski Special Education Services (JAMP) Post Office Box 127 Olmsted, IL 62970 Telephone: 618/742-6231	Pulaski Alexander Johnson Massac
61.	Nelson, Edward A., Jr. LaSalle County Educational Alliance for Special Education (LEASE) 104 North Everett Streator, IL 61364 Telephone: 815/673-1511	LaSalle Marshall 0010 Putnam 5350
62.	Olson, Ernest Mackinaw Valley Special Education Association 2022 North Eagle Road Normal, IL 61761 Telephone: 309/454-1431	McLean Woodford 1080 Woodford 3750
63.	Parker, Dr. Aileen W. Williamson County Special Education District 113 South Russell Post Office Box 39 Marion, IL 62959 Telephone: 618/993-2138	Williamson
64.	Perry, Richard E. Proviso Area for Exceptional Children (PAEC) 1000 Van Buren Street Maywood, IL 60153 Telephone: 312/450-2100	Cook
65.	Peters, William DeKalb County Special Education Association 145 Fisk Avenue DeKalb, IL 60115 Telephone: 815/756-8589	DeKalb
66.	Pfeiffer, Richard Mid-Valley Special Education Post Office Box 188 St. Charles, IL 60174 Telephone: 312/584-1100, Ext. 277	Kane

	NAME AND ADDRESS	COUNTY OR COUNTIES
67.	Powell, John Winnebago County Special Education Cooperative 329 School Street Rockton, IL 61072 Telephone: 815/624-2615	Winnebago
68.	Randle, Dr. Kenneth Lewis Kankakee School District, Department of Special Education 1494 East Court Street Kankakee, IL 60901 Telephone: 815/933-0720	Kankakee
69.	Rehnberg, David C. 121 South Stanley Street Muldoon Center Rockford, IL 61102 Telephone: 815/966-3163	Winnebago
70.	Retterer, Dr. Russell Exceptional Children Have Opportunities 320 East 161st Place South Holland, IL 60473 Telephone: 312/333-7880	Cook
71.	Reynolds, Ellen 1600 Dodge Avenue Evanston, IL 60204 Telephone: 312/492-3940 312/492-3841	Cook
72.	Riggen, Dr. Theodore F. Special Education Cooperative of South Cook County (SPEED) 1125 Division Street Chicago Heights, IL 60411 Telephone: 312/481-6100	Cook Will 201U
73.	Robinson, Tunya East St. Louis Area Joint Agreement Webster School Annex Tenth and Gaty East St. Louis, IL 62201 Telephone: 618/874-4550 618/874-4551 618/874-5181	St. Clair
74.	Roland, Dr. James 1704 East Washington Urbana, IL 61801 Telephone: 217/384-3655	Champaign

	NAME AND ADDRESS	COUNTY OR COUNTIES
75.	Schoolfield, Dr. Roy 201 West Clay Collinsville, IL 62234 Telephone: 618/345-5350	Madison
76.	Smith, Dr. Edward W.D. Black Hawk Area Special Education District (BASED) 814 - 30th Avenue East Moline, IL 61244 Telephone: 309/755-5214	Rock Island Henry Mercer
77.	Sparks, E. Lyle Tri-County Special Education District 1725 Shomaker Drive Murphysboro, IL 62966 Telephone: 618/684-2109	Jackson Perry Union
78.	Strain, Owen (Gene) South Eastern Special Education Program (SESE) Post Office Box 185 Ste. Marie, IL 62459 Telephone: 618/455-3396	Crawford Clay Jasper Lawrence Richland
79.	Suelter, Barbara Special Education Association of Peoria County (SEAPCO) 2410 West Heading Avenue Peoria, IL 61604	Peoria Fulton 3240
80.	Swanson, Bonnie J. West Central Illinois Special Education Cooperative 323 West Washington Macomb, IL 61455 Telephone: 309/837-3911	Hancock Fulton Henderson McDonough Schuyler
81.	Vallejo, Julia 417 Fifth Street Aurora, IL 60505 Telephone: 312/896-9731	Kane
82.	Vickers, William E. 1201 North Sheridan Road Waukegan, IL 60085 Telephone: 312/336-3100	Lake
83.	Vuillemont, Larry D. Special Education District of Lake County (SEDOL) 4440 Grand Avenue Gurnee, IL 60031 Telephone: 312/623-0021	Lake

	NAME AND ADDRESS	COUNTY OR COUNTIES
84.	Wagner, Roger 4 South Gifford Street Elgin, IL 60120 Telephone: 312/888-5065	Kane
85.	Weaver, Dr. John B. 703 South New Street Champaign, IL 61820 Telephone: 217/351-3841	Champaign
86.	Weber, Duane E. Madison County Special Education Cooperative Region II #9 Dude Street Post Office Box 540 Edwardsville, IL 62025 Telephone: 618/656-9550	Madison
87.	White, Orval J. Lockport Area Special Education Cooperative 1101 South Hamilton Street Lockport, IL 60441 Telephone: 815/838-8080	Will
88.	Wrath, H. James South Will County Cooperative for Special Education (SOWIC) Laraway School West Laraway Road Joliet, IL 60436 Telephone: 815/723-0345 815/723-7787	Will
89.	Wright, Michael Grundy Couty Special Education Cooperative 519 Franklin Street Morris, IL 60450 Telephone: 815/942-5780	Grundy

Rehabilitation Services

Illinois Department of Rehabilitation Services
623 East Adams
P. O. Box 1587
Springfield, IL 62705
217-782-2093

Dena P. Venable
Accessibility Coordinator
217-782-5286

Bonnie L. Gladden
Bureau of Rehabilitative Services
for Children
217-782-2093

Check local phone directory for the regional Department of Rehabilitation Services office.

State Schools

Illinois School for the Visually
Impaired
658 East State Street
Jacksonville, IL 62650
217-245-4101

Dr. Richard Umsted
Superintendent

Instructional materials for the visually impaired can be obtained on a loan basis from:

State Depository of Adapted materials for the
Visually Impaired
444 West Reynolds
Springfield, IL 62702
217-525-3300

Illinois School for the Deaf
125 South Webster Avenue
Jacksonville, IL 62650
217-245-5141

Dr. William P. Johnson
Superintendent

Instructional materials and captioned films can be obtained from the Illinois School for the Deaf Media Center.

FUNDING

There are several public and private sources that may be able to provide funds to make laboratories and equipment accessible to the physically handicapped. However, there is no source that provides funds solely for removing architectural and/or instructional barriers. Therefore, personnel who are seeking funds to support the removal of barriers or to purchase technology to increase mobility for physically handicapped students may need to utilize several sources to adequately fund the necessary modifications.

PUBLIC SOURCES

Local School Budget

The local school budget supported from general state aid and the local property taxes, can include items in either the Building Maintenance and Operations Fund or the Education Fund for removing barriers and/or purchasing specialized equipment. However, most districts in Illinois are having moderate to severe financial problems with these two funds being stretched to their limits. Therefore, districts may consider the use of the Life/Safety Fund to remove architectural barriers. Life/Safety funds can be raised by levy or selling Life Safety bonds.

ISBE/DAVTE Reimbursement

The costs of modifying vocational education laboratories and equipment can be used to justify excess costs for the ISBE/DAVTE vocational education reimbursement add-on factor for handicapped students.

94-142 Flow through Monies

Funds for the purchases of specialized equipment (i.e., wheelchairs, chair lifts, etc.) can be included in the application for 94-142 flow through monies. The use of these funds for this type of equipment is a local special education decision. There are no funds set-aside specifically for the purpose of accessibility (i.e., new technology or architectural barrier removal).

Division of Services for Crippled Children

Each state has a special program, using state and federal funds, for handicapped children who require special diagnostic and treatment services. In Illinois, the program is called the Division of Services for Crippled Children (DSCC) and is administered by the University of Illinois.

The Illinois Division of Services for Crippled Children can assist children with the following problems:

1. Orthopedic conditions, such as clubfoot, curvature of the spine, amputation, arthritis.
2. Rheumatic fever and/or diseases and deformities of the heart.
3. Conditions of the nervous system which require specialist care, such as cerebral palsy, epilepsy, spina bifida.
4. Defects which respond to plastic surgery, such as cleft lip and cleft palate and burn scars.
5. Organic speech defects.
6. Hearing loss.
7. Cystic fibrosis.
8. Phenylketonuria (PKU).
9. Hemophilia.

Only specialist care is provided by the Division of Services for Crippled Children.

Services provided by the Division may include:

1. Diagnostic evaluation, consultation, treatment.
2. Hospital and medical care.
3. Specialized convalescent/rehabilitative care.
4. Speech, hearing, physical and occupational therapies.

5. Appliances such as braces, limbs, and hearing aids.

Diagnostic evaluation, to establish medical eligibility, is available without charge.

Beyond the diagnostic evaluation, the Division's funds may help pay for specialized services when the family finances cannot meet this expense. Many children with severe, long-term disabilities need the Division's assistance with programming even though the family can pay for the care.

Children with disabilities require individual planning which takes into account all of their problems including the physical handicaps. Some may need a large number of therapies in a medical center, while others may be helped in their own community.

The Division of Services for Crippled Children works closely with other public and private agencies to see that the child's total needs are met.

University of Illinois
Division of Services for Crippled Children

The Central Office is located at:

540 Iles Park Place
Springfield, IL 62718
(217) 782-4960

The Division Offices are located at:

4302 North Main Street
Rockford, IL
(815) 987-7571

130 North Court Street
Dixon, IL
(815) 288-4211

43 East Ohio Street
Chicago, IL
(312) 996-3550

5414 North University Avenue
Peoria, IL
(309) 691-2200

2125 South First Street
Champaign, IL
(217) 333-6528

4500 South Sixth Street Road
Springfield, IL
(217) 786-6887

2100 - 18th Avenue
Rock Island, IL
(309) 788-4300

1205-B South West Street
Olney, IL
(618) 392-5141

#10 Collinsville Avenue
E. St. Louis, IL
(618) 875-9300

2209 West Main Street
Marion, IL
(618) 997-4371

Department of Rehabilitation Services

The Department of Rehabilitation Services (D.O.R.S.) provides funding for a wide range of services for eligible handicapped clients. These "services" can include adaptive aids/devices or new technology, if the equipment is part of a viable plan for the client. Of course, the funds provided by D.O.R.S. would be less the amount that would be determined to be the responsibility of the LEA. Contact the D.O.R.S. office in your area for further information about funding possibilities.

PRIVATE SOURCES

Various private organizations often provide funds for adaptive equipment, etc., for the handicapped. Some of these organizations are listed on pages 93-96 of this handbook. In addition, local service clubs may provide funds (i.e., the Lions' Club provides money and services for the visually impaired, the Shriners provide medical services and hosptials for crippled children).

A "VISIBLE BELL" FOR HEARING IMPAIRED TYPISTS

Developed by Bob Engle
Illinois School for the Deaf, Jacksonville, IL.

The "visible bell" warning device provides a visible warning when the right margin is reached on a typewriter. It is adaptable to either manual or electric models. It provides an attention getting series of flashes that coincide with the sounding of the bell in the typewriter.

The device consists of an electronic warning flasher modified to provide faster light flashes at a lower intensity than the unmodified circuit. A contact, constructed from a small aluminum bracket and a section of small diameter expansion spring (1" x 1½" L) is added to the typewriter and so positioned that the bell actuator arm contacts the spring as the bell rings. The use of the spring as a contact insures that this device will in no way interfere with normal operation of the typewriter.

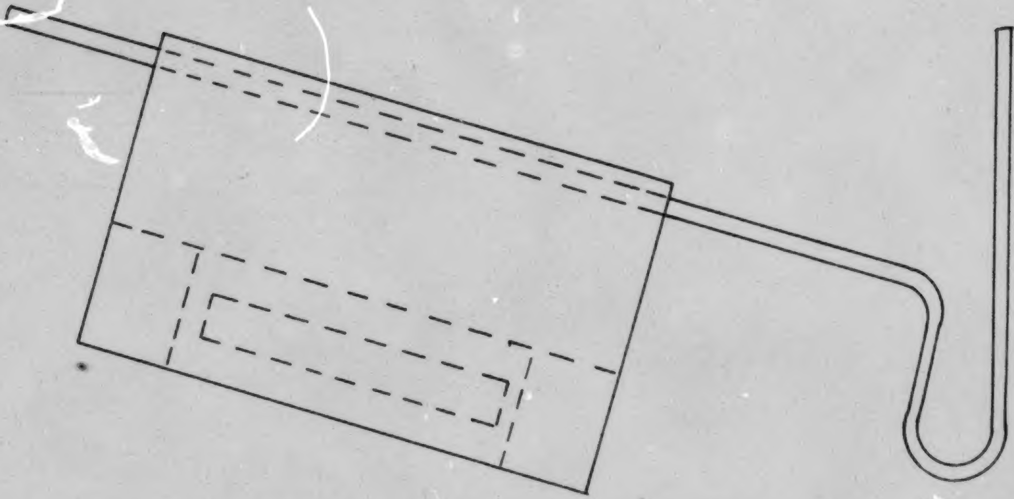
The entire unit may be constructed in a small box that can be attached to a standard typist's copy stand and so positioned that the light flashes are reflected from the copy. The warning flasher is available from Chaney Electronics, P.O. Box 27038, Denver, CO, 80227.

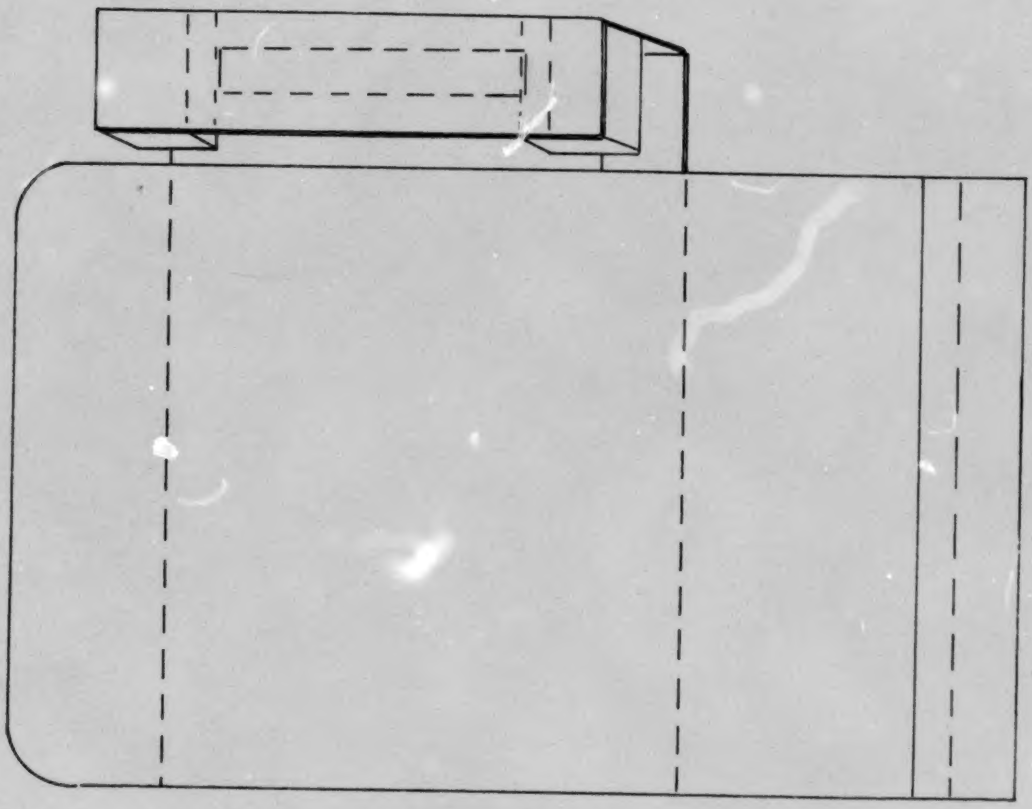
The modification to the unit consists of changing C3 to a 1MFD 450V unit and adding a snall heatsink to Q1. Battery life is very good and should exceed three months in daily use (e.g., a typing class). It is recommended that alkaline batteries be used with this device.

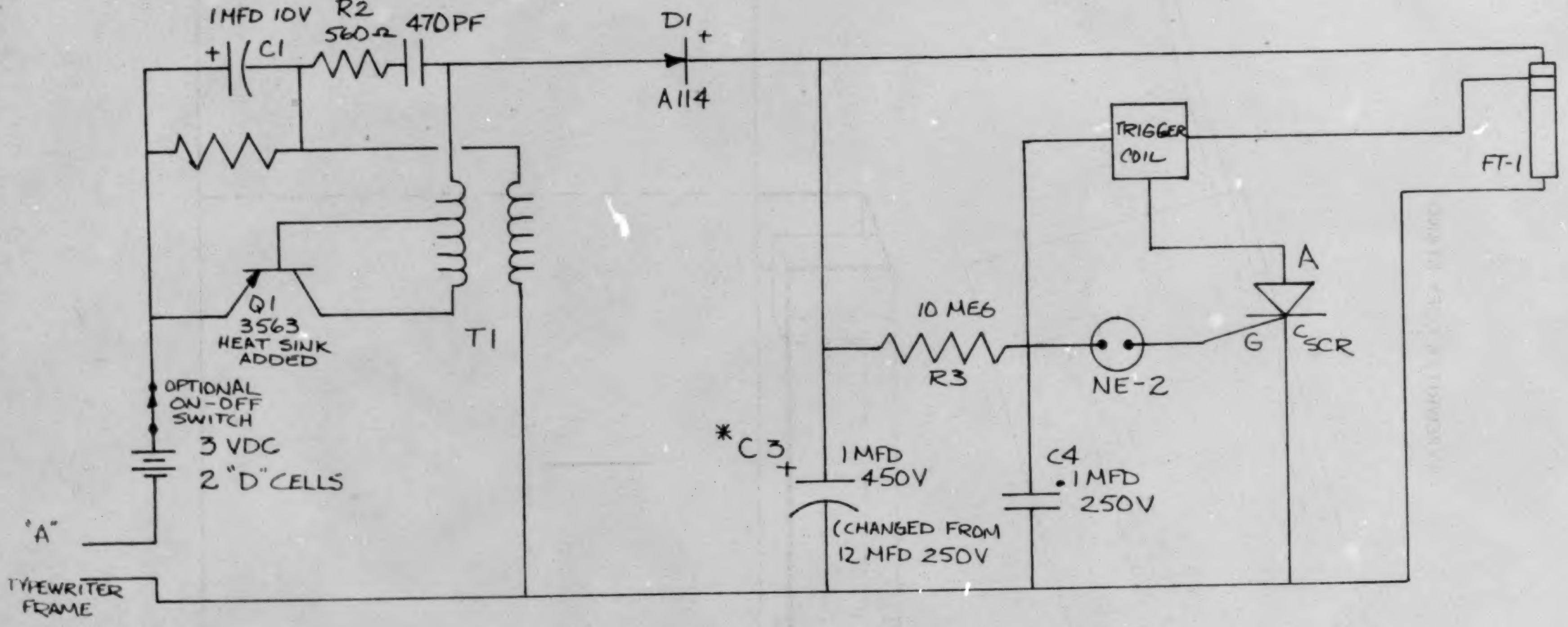
The positioning and adjustment of the contact within the typewriter will depend on the model used. This may require a bit of mechanical ingenuity. The total cost of the unit should be under $25.00

No special electrical safety problems are presented by the unit, however, care should be taken that the leads to the flashtube are not exposed and that the flash tube itself is protected from mechanical damage. The drawings are only one method of housing and positioning the device and should be modified to suit the needs of the user.

TYPEWRITER COPY STAND






1MFD 10V
+
C1
R2
560Ω
470PF
D1
+
A114
Q1
3563
HEAT SINK
ADDED
T1
OPTIONAL
ON-OFF
SWITCH
3 VDC
2 "D" CELLS
"A"
TYPEWRITER
FRAME
TRIGGER
COIL
FT-1
A
10 MEG
R3
NE-2
G
C
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*C3
+
1MFD
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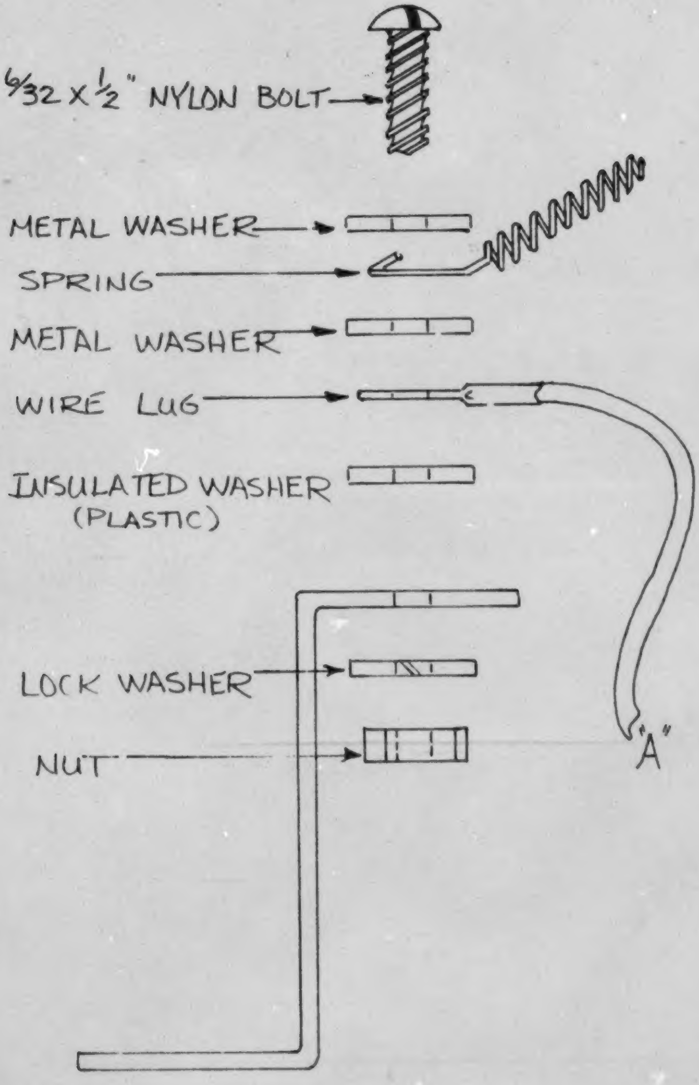
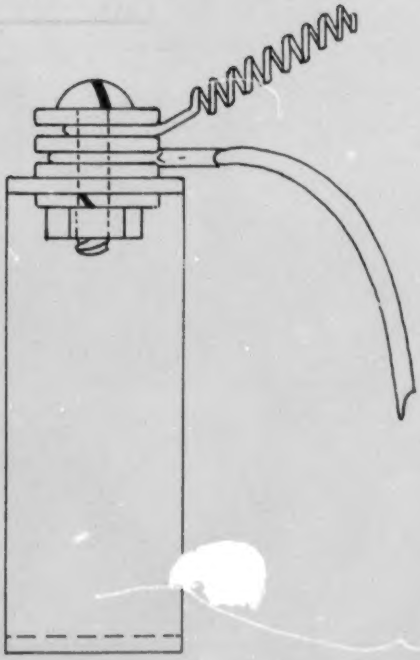
(CHANGED FROM
12 MFD 250V
C4
.1MFD
250V

CHANEY ELECTRONICS MODEL C23207 (MODIFIED)


6/32 X 1/2" NYLON BOLT
METAL WASHER
SPRING
METAL WASHER
WIRE LUG
INSULATED WASHER (PLASTIC)
LOCK WASHER
NUT
"A"

C

CONTACT DETAILS



The Mainstreaming Elevating wheelchair can provide access to equipment and related services for some orthopedically impaired students.

ACCESSIBILITY STANDARDS ILLUSTRATED

138

Condensed and printed by
DEPARTMENT OF REHABILITATION SERVICES
STATE OF ILLINOIS

These Accessibility Standards were prepared in accordance with Public Act 79-978; "Facilities for the Handicapped Act" (Approved June, 1965) and developed by the Capital Development Board (Michael A. Jones, ARIBA); June, 1978.

The standards contained herein are a condensed version of the legal document submitted by the Capital Development Board entitled "Accessibility Standards, Illustrated."

1.1 GENERAL

1.1.1 SCOPE

a. The scope of this Standard is to make the built environment safe and functional for people, including persons with mobility and communicative disabilities.

b. This Standard applies to all public buildings and site facilities of a permanent or temporary nature, open to and useable by the public, including new construction, remodeling, rehabilitation and historic preservation.

c. This Standard is concerned with people considered handicapped as a result of physical, mental and communicative disabilities.

1.1.2 PURPOSE

The purpose of this Standard is to provide insight and education to all those responsible for the built environment by providing design requirements which will result in buildings and facilities being safe and functional for people considered handicapped.

1.1.3 DEFINITIONS

ACCESSIBILITY is the combination of various elements of the built environment which allows entrance to, egress from, and use of buildings and facilities by the public.

ACCESS AISLE is a circulation space between objects such as desks, tables, shelves, displays or cars.

ADMINISTRATIVE AUTHORITY is the building department or other regulatory agency having jurisdiction over the issuance of building or occupancy permits.

AMBULATORY describes people who walk without assistance or difficulty.

APARTMENT means dwelling unit defined by this Standard.

APARTMENT BUILDING is any building, or portion thereof, which is designed, built, rented, leased, let or hired out to be occupied, or which is occupied as the home or dwelling unit of three or more families living independently of each other in apartments of the said building.

AUDIBLE CUE is a sound or verbal communication or alert.

BASIC ACCESSIBILITY is the minimum combination of elements in the built environment which allows entrance and essential use of buildings and facilities by the public.

BLEND TO A COMMON LEVEL refers to the meeting of two or more surfaces so that there is no abrupt vertical change in any of the surfaces which could create a tripping hazard or divert the direction of the caster wheels on a wheelchair.

CIRCULATION ROUTE, PATH OF TRAVEL, PATH is a way taken by people from one place to another in the environment and includes both horizontal and vertical travel.

COMPLY WITH, CONFORM TO means meeting all the requirements of a specific standard or section thereof.

CUE, CUEING AID is a device which prepares, alerts or warns people.

CURB is the boundary of a street, sidewalk or walk which has been raised to protect or contain.

CURB RAMP is a pedestrian ramp which cuts through a curb or builds up to it from a lower level to connect two horizontal levels.

CROSSWALK, PEDESTRIAN CROSSING is a marked path designed for pedestrian use in crossing streets.

DETECTABLE is that which can be located and identified.

DISABLING CONDITION is a permanent or temporary impairment that affects the physique, the mind or communication.

DWELLING UNIT is a single unit providing complete independent living facilities for one or more persons, including provisions for living, sleeping, eating, cooking and sanitation.

ELDERLY is the population 65 years old and over.

EXIT is a continuous and unobstructed means of egress to a public way and shall include, but not be limited to, intervening doors, doorways, corridors, exterior balconies, ramps, stairways, smokeproof enclosures, horizontal exits, exit passageways, exit courts and yards.

EVACUATION PLAN is a plan that has been approved and tested by the administrative authority having jurisdiction over the building for the exiting of people from a building or facility in the case of an emergency,and shall have specifically named persons who will aid all disabled people requiring assistance until they are clear of the building. This may involve the use of a key operated elevator for those who cannot use stairs.

FIRE RESISTIVE RATING is the time in hours or fractions thereof that materials or their assemblies will resist fire exposure, as determined by fire tests conducted in compliance with recognized standards.

FULL ACCESSIBILITY is the combination of various elements of the built environment which allows entrance to, and maximum use of buildings and facilities by the public.

HANDICAPPED PERSON means a person who, on account of a physical, mental or communicative disability, is restricted in the use of the built environment because of obstacles which the lack of suitable facilities interposes between the individual and his or her maximum functional level.

Note: Characteristics of the built environment, rather than the degree of disability, determine whether or not a person is handicapped. A handicap occurs when a person encounters an environmental barrier which prevents or inhibits activities of daily living. For example, narrow toilet doors, not affording access to a person in a wheelchair, will prevent the employment of that person in a building; or a child, considered able-bodied, is handicapped when stranded in a malfunctioning elevator of a highrise apartment building because the emergency button and telephone are out of reach.

HARD SURFACE is a prepared surface which is firm and stable, even when wet.

HISTORIC PRESERVATION AND HISTORIC RECONSTRUCTION embraces all buildings, facilities, open spaces, and historic districts which are built, repaired and/or have changes in the occupancy, will be open to the public, and appear on the national or state Historic Register, or nominated for either. Historic preservation and historic reconstruction shall conform to this standard and provide basic accessibility. See Section 18 for specific requirements.

IN-CAR LANTERNS are visual signals located on elevator car door jambs indicating the direction of travel.

INCOORDINATION is the inability to produce desired harmonious muscular action.

INCONTINENCE is the inability to control bodily evacuative functions.

INTERIOR OFFICE LANDSCAPING is office space defined with non-structural, relocatable partitions.

ISLAND is a place of refuge for pedestrians in the middle of a street.

LIP is an abrupt vertical change in level.

LISTENING SYSTEM is a built-in audio system provided for auditory impaired persons.

MAJOR ENTRANCE is any access point to a building, portion of a building or facility used for the purpose of entering, but does not include doors to fire stairways, other emergency exits, or doors used for servicing the building.

MANUAL DOOR OPENER is a non power-operated device that is used for opening doors.

MEANS OF EGRESS is the path of exit travel from any point in a building or facility that meets all applicable code requirements of administrative authorities with jurisdiction over the building or facility.

NON-DETECTABLE AREA is the area that cannot be located by long cane techniques used by the blind and visually impaired.

OCCUPANCY is the purpose for which a building or part of a building is used or is intended to be used.

OPERABLE PART is that part of a device or mechanism that is used to activate, control or adjust equipment, apparatus and appliances.

ORTHOTIC is a bracing device used to strengthen or assist a part of the body.

PASSENGER LOADING ZONE is a place specially provided outside of the vehicular traffic flow designed for the drop-off or pick-up of passengers from vehicles.

PAY TELEPHONE is a public or semi-public, coin-operated telephone.

PERCEIVABLE is that which can be detected by one of the senses, with or without an aid.

PREVAILING EQUIVALENT SOUND LEVEL is the normal, average sound level to be expected in a given environment, excluding sounds of short-term duration such as fire, police or ambulance sirens, passing train noises, whistl[illegible]orns and telephone bells, etc.

PROSTHESIS is an artificial [illegible] to replace a missing part of the body.

PUBLIC BUILDING MEANS:

PUBLIC BUILDING MEANS:

a. A building, structure or improved area owned or leased by this State or its political subdivisions;

b. A building, structure or improved area used primarily as a place of gathering or amusement;

c. Office buildings and factories. The second floor of any two-story office building or factory having less than 15,000 square feet at the second floor level, or any occupied levels below grade having less than 15,000 square feet (unless the building is publicly owned) are not required to be wheelchair accessible.

All publicly and privately owned buildings will comply with this Standard except single and two family residences and the second and third stories of apartment buildings not served by elevators.

Note: The application of this Standard includes, but is not limited to, the following building types:

Sleeping Occupancy:	Apartment buildings, apartments, hotels, motels, hostels, dormitories, housing for the elderly, housing for the handicapped, etc.
Business Occupancy:	Offices, shops, department stores, grocery stores, fast food establishments, etc.
Educational Occupancy:	Day care centers, primary, secondary and post secondary educational facilities of a public or private nature, museums, art galleries and other cultural facilities, etc.
Industrial Occupancy:	Factories, warehouses, plants, industrial parks, etc.
Assembly Occupancy:	Stadia, auditoria, theaters, dance halls, skating rinks, bowling alleys, restaurants, taverns, night clubs, cafeterias, banquet halls, etc.
Institutional Occupancy:	Hospitals, nursing homes, mental institutions, jails, prisons, etc.
Outdoor Areas:	Parks, camping grounds, public swimming pools and beaches, zoos, botanical gardens, amusement parks, fairgrounds, playgrounds, etc.
Transportation Facilities:	Bus, train, air terminals and/or stations.
Places of Worship and Meditation:	Churches, Synagogues, Temples, etc., including ancillary educational facilities.
Other:	Funeral homes, fraternal and private organization facilities including country clubs, parking garages, gas stations, etc.

PUBLIC SPACES are those spaces in a building or facility that are available for use by all people in that environment.

PUBLIC means users of buildings and facilities, including handicapped persons. Users fall into two categories, visitors and employees, and the functional needs of handicapped persons as visitors and employees shall be considered in new construction and remodeling of buildings and facilities.

REDUNDANT CUE is a method of communicating a message, instruction or warning in a multiple way, so that it can be perceived by more than one of the senses. For example, a curb ramp having a surface which contrasts in color and texture with the adjacent surfaces can be perceived by blind and sighted people. Flashing lights accompanying alarm bells warn deaf, blind and able-bodied of the danger.

REFUGE is a place that provides protection from danger.

REGULAR BUSINESS HOURS are those hours in which a building is kept open to the public for the regular transaction of business, recreation, etc.

REMODELING embraces rehabilitation and renovation of existing buildings including improvements, extensions, repairs, structural alteration, changes in design or layout, or changes in the occupancy of the building. Maintenance, redecoration, changes to the heating, ventilation and air conditioning systems or reroofing, and changes to interior office landscaping shall not be included under remodeling requirements. See Section 17 for specific requirements.

SEMI-AMBULATORY describes those people who walk with difficulty, with or without aids, such as canes, crutches or walkers.

SERVICE ENTRANCE is an entrance intended for [illegible] servicing of a building or facility and used by maintenance and service personnel, and others delivering or removing goods and/or chattels.

SIDEWALK is a prepared walk within a street right-of-way.

SINGLE FAMILY RESIDENCE is a building that contains one dwelling unit.

SITE is a parcel of land bounded by property lines.

SITE ACCESS POINT is the place where the property line or boundary is crossed in order to gain access to the site, or buildings and facilities on the site.

SITE FURNITURE, STREET FURNITURE is permanent equipment located on the site outside of buildings and facilities including benches, tables, lighting poles, telephones, drinking fountains, signs and other devices of a functional or decorative nature.

SPASTICITY is involuntary muscle spasms which cause parts of the body to move or jump.

SUITABLE FACILITIES means environments and their components which are safe, convenient and functional, and accommodate the abilities of the maximum number of people; for example, door hardware which does not require grasping and twisting of the wrist to open the door can be operated by more people than a device which requires the grasping and twisting movements.

SUPPORT is a device that is provided in the environment to assist people while they are changing position or walking and include, but not limited to, grab bars, handrails, guardrails, poles and shower seats.

TACTILE CUE is an alert warning device that can be perceived by using the sense of touch.

TWO FAMILY RESIDENCE is a building containing two dwelling units.

VISUAL AID is a visible cueing device used to prepare, alert or warn.

VISUAL EMERGENCY WARNING is a flashing light that is used to arouse and alert the deaf and hard of hearing of an emergency.

WALK is an exterior pathway with a prepared surface intended for pedestrian use.

WALKING AID is a device to aid walking such as a cane, crutch or walker.

ZONED ELEVATOR is an elevator which does not stop at all floors but serves specific floors in a building.

1.1.4 PLANS AND SPECIFICATIONS TO MEET STANDARDS

One year after the approval of these Standards, the appropriate contracting authority must determine that the plans and specifications of every public building which the State or any political subdivision, governmental entity or public authority constructs or remodels shall meet these Standards.

One year after the effective date of these Standards, no building permit or other official authorization for construction of a public building as defined in Section 1.1.3 is valid, unless it recites that the plans and specifications meet these Standards.

1.1.5 ENFORCEMENT VIOLATIONS

The Attorney General shall investigate any complaint or report violation of these Standards, and where necessary to ensure compliance with these Standards, the Attorney General may, at any time, bring action for mandamus, injunction or other appropriate relief.

1.1.6 REVISIONS TO STANDARDS

These Standards may be revised from time to time by the Capital Development Board. Revised standards shall be published as tentative versions. Public hearings shall be held within three months of publication of the tentative standards, if requested in writing by any interested person. Within six months after the publication of tentative standards, the Capital Development Board shall issue final standards. Tentative and final standards shall be filed with the Secretary of State in accordance with 'An Act Concerning Administrative Rules' Illinois Revised Statutes Chapter 127, Section 1, et seq.

1.1.7 SEVERABILITY CLAUSE

If any provision of these Standards or application thereof to any person or circumstances is held invalid, such invalidity does not affect other provisions or applications of these Standards, which can be given effect without the invalid provision or application to this end, the provisions of these Standards are declared to be severable.

3.1 EXTERIOR CIRCULATION ROUTES

Careful site development is the most effective and usually the most economical means of resolving the problems of accessibility. These Standards require access to the full range of facilities provided for the public, including access to and across the site to accessible entrances, gardens, recreational facilities, parking and also interior courtyards or gardens. The siting of facilities, grading, parking, and the routes of walks shall provide convenience, safety and unrestricted movement of people and vehicles.

3.1.1 There shall be at least one path of travel that shall have no steps or slope greater than 1:12 from at least one site access point to the major entrances of buildings and facilities. This route shall be as direct as site conditions allow.

[illegible].2 The grading of the ground shall insure level or gradually sloped pedestrian access routes to all facilities.

Note: Studies at Wright State University School of Medicine in Dayton, Ohio, reveal that the manually operated wheelchair is only 5% efficient in terms of work performed per quantity of oxygen consumed. Ordinary walking has a 25% efficiency. Because of the work expenditure for persons in wheelchairs, level routes or routes with slopes that are below the maximum allowable are preferable to shorter routes which have a maximum sloped ramp.

3.1.3 Where parking is provided, spaces for disabled drivers shall be those that are closest to the accessible entrance of the building served.

3.1.4 If moving walkways are provided, they shall be wide enough to accommodate a wheelchair and have a minimum clear width of 3'-0".

3.2 WALKS, SIDEWALKS

Walks and sidewalks shall be designed to allow free movement of pedestrians to site facilities and adjacent streets, to allow passing of pedestrians using the walks and shall be free of hazards.

3.2.1 The minimum clear width of walks and sidewalks shall be 3'-0". Where the incidence of people in wheelchairs or those using walking aids is high, such as at health facilities, special housing, etc., the minimum width of walks shall be 5'-0". Walks less than 5'-0" wide shall have places wide enough for two wheelchairs to pass and be 5'-0" minimum in width and 7'-0" minimum in length occurring at intervals not to exceed 100'-0".

3.2.2 Walks and sidewalks shall be of a continuing common surface, not interrupted by abrupt changes in level. Surfaces shall be firm and stable and shall not present slipping hazards.

[illegible].3 Large areas or long stretches of small unit components, such as brick and stone, shall not be used on accessible pathways unless the components are laid on a firm base, and the joints do not exceed 1/2" in width and are flush with the adjoining surfaces.

3.2.4 Walks with gradients steeper than 1:20 shall be considered as ramps and conform to the requirements of Section 6.1, Ramps and Section 6.3, Handrails and Guardrails. Ramps on walks shall not be steeper than 1:12.

3.2.5 Walks with sustained gradients of no greater than 1:20 shall have level areas of at least 5'-0" in length at approximately 100'-0" intervals for the purpose of rest.

3.2.6 The cross slope or crowning of walks shall be between 1:50 and 1:100. Where vehicular driveways intersect with walks, design priority shall be given to the pedestrian and not the vehicle.

3.2.7 Gratings, manhole covers and other access covers shall be placed outside of walks unless site constraints prevent this. Where they must occur in walks, gratings shall have a maximum clear opening of 3/8" in the narrow direction and the long dimension will be at right angles to the direction of pedestrian travel along the walk. Solid covers occurring in walks shall not have changes in the vertical surface dimension that exceed 1/4".

3.2.8 Walks shall preferably be level at building entrances, but where drainage is required, the area in front of the door may be sloped no more than 1:50. This area shall extend at least 1'-6" beyond the handle side of the door and be a minimum of 5'-0" in depth from the face of the door.

3.2.9 When a hazardous area occurs alongside a walk or pedestrian area, a tactile cue, curb or railing shall be provided to warn the blind, and prevent people from inadvertently leaving the walk. See Section 12.3, Tactile Warning Signals and Blind Location Cues.

3.2.10 No rigid or hard object shall project into the space above a walk lower than 7'-6" measured from the walk surface. Below this height, protruding objects which project more than 4" from a wall or a column must:

a. continue to the floor; or

b. to within 8" of the floor; or

c. be located in protected areas which are recessed or enclosed by wing walls. Such a protected area shall have a contrasting floor texture and color.

d. Door and door closures do not have to conform to this requirement.

e. Where low ceiling heights prohibit the placing of Emergency Exit signs above 7'-6" from the floor level, these signs may be placed at a minimum of 6'-6" from finished floor level to the bottom of the sign.

3.3 CURB RAMPS

3.3.1 Wherever walks and sidewalks intersect with other walks and sidewalks, parking lots, driveways, or streets, the surfaces shall blend to a common level to allow smooth passage of wheelchairs.

3.3.2 The minimum width of curb ramps shall be 3'-0" measured across the usable surface of the ramp.

3.3.3 Curb ramps shall be no steeper than 1:12. When there is no other way of overcoming the constraints of an existing sidewalk's condition, the slope may be increased in steepness, but shall not exceed 1:8. The curb ramp surface shall blend with the street at a common level. There shall be no lip at the bottom of the ramp. The sides of the curb ramp shall not be steeper than 1:8. The whole curb ramp shall contrast in color and texture to the surrounding walk surface. See Table 6.1.1.

3.3.4 Curb ramps shall be designed so that they direct people into the crossing.

3.3.5 The surface of curb ramps shall be joint free and slip-resistant. See Section 13.1, Ground and Floor Surfaces.

3.4 STREET CROSSINGS

Intersections of walks with streets shall minimize conflicts between pedestrians and vehicles.

3.4.1 Street crossings shall be considered as continuations of walks and sidewalks and meet the requirement of Section 3.2, Walks, Sidewalks, and Section 3.3, Curb Ramps.

3.4.2 Where street crossings intersect with islands, the surface of the islands shall blend to a common level with the crossing surface. The surface of the crosswalk at the island shall have a different texture and color to give indication to the visually impaired. See Section 12.3, Tactile Floor Surface Alerts.

3.4.3 Islands shall be a minimum of 4'-0" wide to prevent people in wheelchairs from protruding into the flow of vehicular traffic when waiting to continue crossing. A support device shall be provided to steady people with balance problems while they wait for vehicles to stop moving. The support device may be a guardrail or pole.

3.4.4 Pedestrian overpasses and underpasses shall be accessible paths of travel and meet the applicable requirements of this Standard, and follow the requirements of Section 6.1, Ramps and Section 3.2, Walks, Sidewalks.

3.5 PARKING

Parking for the disabled driver accommodates persons unable to use public transportation, but who can achieve independence by driving their own automobiles.

3.5.1 Parking facilities include interior and exterior parking spaces, parking lots, and passenger loading zones.

3.5.2 When parking areas are provided, they shall have handicapped parking spaces or a passenger loading zone located as close as possible to the shortest accessible path of travel to each building, adjacent street or sidewalk served by that parking area. If walks are provided through the parking area, they shall follow the requirements of Section 3.2, Walks, Sidewalks.

3.5.3 Passenger loading zones shall provide an unobstructed space at least 4'-6" wide, parallel to the vehicle to allow unloading and loading of passengers. There shall be no abrupt change of level between the passenger loading zone and the road. There shall be a change of surface texture and color to indicate the boundary of the space used by pedestrians. See Section 12.3, Tactile Floor Surface Alerts

3.5.4 Parking spaces specifically reserved for people who use wheelchairs or walking aids shall be at least 12'-6" wide. Where two adjacent spaces are planned, and entry can be gained by the car going in forward or in reverse, the width of both spaces plus access aisle shall be a minimum of 20'-6" with the access aisle located between the two spaces. If entry can only be gained by going in forward, each space reserved for a disabled driver shall have an access aisle. The access aisles shall be at least 4'-6" wide and preferably be level, but may have a slope for drainage not exceeding 1:50. The surface shall be firm.

3.5.5 **The number of parking spaces planned for disabled drivers in parking lots shall be as shown in Table 3.5.5.**

Table 3.5.5

Total Number of Parking Spaces	Number of Parking Spaces for Disabled Drivers
1-400	A minimum number of 2 or 2% of the total provided, whichever is the greatest
401 and above	8 plus 1% of the total provided above 401

3.5.6 In parking structures, a minimum headroom of 8'-0" shall be provided for circulation and parking of vans used by disabled persons. The number of spaces to be provided with this clearance shall be half of the number of handicapped parking places computed from Table 3.5.5. The access aisle shall be 6'-0" wide, though it may extend into the vehicular circulation route when parallel parking is provided.

3.5.7 Multi-story parking structures without elevators shall have all spaces reserved for disabled drivers on an accessible floor.

3.5.8 Where curbs are required around the parking area, curb ramps shall be provided to the accessible route of travel, and shall conform to the requirements of Section 3.3, Curb Ramps.

3.5.9 Parking spaces for the disabled shall be marked to indicate that they are reserved for disabled drivers, using the International Symbol for Accessibility. Such markings shall be placed on a pole or wall mounted and may be accompanied by markings painted on the surface.

3.5.10 Where pedestrian walks cross vehicular routes, the intersection shall be clearly marked so that drivers shall be warned of the pedestrian crossing.

3.5.11 The requirements of Sections 3.5.4, 3.5.5, 3.5.7, 3.5.8 and 3.5.9 can be waived if attendant parking is provided at all times.

3.6 PEDESTRIAN GATES AND TURNSTILES

3.6.1 Gates shall meet all the requirements of Section 4.1 Entrances and Section 4.2 Door Hardware.

3.6.2 Where turnstiles are provided, an accessible entrance shall be placed immediately to one side of the turnstile. This entrance shall meet the requirements of Section 4.1, Entrances, and Section 4.2, Door Hardware.

3.7 SITE FURNITURE

Site furniture includes, but is not limited to, the following permanent construction: signs, lighting standards, mailboxes, trash cans, seating, planters, tables, advertising kiosks, newspaper boxes, telephone enclosures, etc. Their location shall allow free passage and full, non-hazardous use of site amenities.

3.7.1 If any furniture is mounted on a post or pylon and projects more than 4" into the nondetectable area of blind people who use long canes, then the projection shall:

a. continue to the floor, or

b. to within 8" of the floor surface, or

c. be located in protected areas which are recessed or enclosed by wing walls. Such an area shall have a contrasting floor texture and color.

3.7.2 Signs shall not project into the space above a walk unless the dimension from the bottom edge of the sign to the walk surface is at least 7'-6".

3.7.3 Guy wires required for poles or pylons shall be placed outside of pedestrian circulation areas.

3.7.4 Where rest areas are provided, space shall be included alongside the seating to accommodate those in wheelchairs. This space shall be a minimum of 3'-0" wide and extend a minimum of 4'-0" from the pedestrian flow.

3.7.5 Seating shall be constructed to support a minimum of 250 lbf. for each person accommodated, and be provided with back and armrests. Seating shall not hold water.

3.7.6 Where tables are provided, they shall be designed to accommodate a wheelchair. There shall be clear space of 2'-6" minimum from the ground to the underside of the table. There shall be toe clearance underneath the table of 2'-0" deep, and the space shall be at least 2'-6" wide.

3.7.7 Furniture that will be used by disabled persons shall be located on firm, smooth surfaces of sufficient area to enable maneuvering of wheelchairs. See Section 2.3.2.

3.7.8 Any device used by shops and stores to prevent shopping carts from leaving the premises shall not prevent access to such shops and stores for those in wheelchairs. Entry shall be equally convenient for the disabled and the able-bodied population. See Section 4.1, Entrances, and Section 4.2, Hardware.

3.8 LOCATABLE BARRIERS

3.8.1 Reflecting pools, planting areas and other landscape features occuring in or adjacent to walkways shall have locatable barriers of not less than 6" high. Tree grilles shall meet the requirements of Section 3.2.7, Gratings and Manhole Covers.

3.8.2 Where walks and sidewalks pass alongside or over ditches, embankments or other hazardous areas, guardrails shall be located on both sides of the walk and shall meet the requirements of Section 6.3, Handrails and Guardrails.

3.8.3 Chains, cables or ropes are not acceptable as permanent or temporary exterior barriers unless they are provided within the locatable range of the long cane technique. See Section 2.8.1.

3.8.4 Where temporary barriers are required, the barrier shall be designed to be locatable with the long cane technique and shall protect all sides of the work, opening, or excavation. Visible warnings shall be provided at night.

3.8.5 Where temporary walks are provided around building sites or other situations, the temporary walk shall conform to all requirements of Section 3.2, Walks, Sidewalks. All accessible features temporarily closed by any work shall have alternate accessible features readily available.

3.9 CONTROLS, DISPENSERS AND RECEPTACLES

Controls, dispensers and receptacles shall comply with Section 14.1, Location of Controls, Dispensers and Receptacles.

3.10 SELECTION OF BUILDING PRODUCTS AND MATERIALS

All handrails, guardrails, hardware, electrical and mechanical controls, fixtures, ground surfaces and signage shall comply with the requirements of Section 14, Building Products.

3.11 EXTERIOR STAIRS AND RAMPS

For requirements of exterior stairs and ramps, see Section 6.1, Ramps and Section 6.2, Stairs.

3.12 EXTERIOR PAY TELEPHONES

Exterior pay telephones shall comply with the requiremetns of Section 11.1, Pay Telephones.

3.13 LANDSCAPING

3.13.1 Landscaping adjacent to walks shall be chosen with consideration to the following criteria:

a. Thorny plants shall not be used immediately adjacent to walks.

b. Branches that overhang walks shall be pruned back to the height of 8'-6" above ground and shall hang no lower than 7'-6" above the ground.

c. Plants that drop large seed pods that could be hazardous under foot shall be placed so that they do not overhang the walk.

d. Poisonous plants adjacent to walks and rest areas shall be removed.

4.1 ENTRANCES, DOORS AND DOORWAYS

All major entrances (exits) to buildings and rooms shall be accessible.

4.1.1 The floor on the inside and outside of each doorway shall preferable be level, but may slope no more than 1:50 for drainage purposes. On the pull side of the door, when location allows forward access only for those in wheelchairs, the floor shall be clear for a distance of 5'-0" from the door and shall extend a minimum of 1'-6" beyond the pull side of the door, measured from the wall opening, unless the doors are automatic.

Where side access for those in wheelchairs is possible, the floor shall be clear for a distance of 4'-0" from the door. On the push side of the door, the floor shall be clear for a depth of 3'-6" in residential construction and 4'-0" in all other construction, and be clear at least the full width of the door opening.

4.1.2 An accessible entrance shall be placed immediately to one side of revolving doors or turnstiles when they are provided. The doors of the accessible entrance shall have opening devices on both faces of the door, and shall not be locked during regular business hours.

4.1.3 Entrances shall have a minimum clear width of 2'-8". This dimension shall be measured from the face of the door to the face of the door stop.

4.1.4 Where more than one door is required at entrances, a left and a right-handed door shall be provided to give disabled persons the choice of door to open which corresponds to their strongest arm.

4.1.5 The minimum space between two hinged doors in a series shall be the width of the door swinging into the space plus 4'-0". Door swings of doors in series shall open in the same direction. Single doors hung in series shall be hinged at the same side.

At vestibules where doors are at right angles to each other, the dimension between the wall with the inswinging door and the facing wall shall be 6'-6" minimum. The minimum dimension in the other direction shall be 5'-0".

4.1.6 Where double doors are used, at least one leaf shall allow a 2'-8" clear opening. It is preferable that each leaf should allow a minimum clear opening of 2'-8".

4.1.7 Entrances shall be designed so that doors shall not swing into the path of passing pedestrians, except as provided for by Section 4.1.16.

4.1.8 If door mats are provided at accessible entrances, they shall be firmly secured.

4.1.9 Door mats and gratings shall not be barriers. Thick door mats shall be recessed into the surface and shall not project more than 1/2" above the floor finish. Gratings provided at doors for the removal of snow and sand, etc., shall have a grid opening of no more than 3/8" in the narrow direction. The long direction shall run at right angles to the direction of pedestrian travel. The surface of the grating shall be level with the adjacent floor surface.

4.1.10 The maximum height of thresholds at exterior and interior doors shall be 1/2" and they shall be bevelled to allow wheelchair access. They shall not have a vertical change in level. It is preferable that thresholds be flush with the floor surfaces. Where there are differences in floor level between rooms or spaces, the threshold shall be sloped at no more than 1:20.

4.1.11 Where sliding doors are used as accessible entrances, the opening hardware shall be exposed and usable from both sides when the door is in the open or closed position. Automatic doors are exempt from this requirement.

4.1.12 At least the bottom 10" of all doors shall have a smooth and uninterrupted surface. Where narrow frame doors are used, a 10" high smooth panel applied to the frame or a solid flush inset panel raising the height of the bottom rail to 10" are both acceptable. Automatic and sliding doors are exempt from this requirement.

4.1.13 The force required to open a door shall not exceed 15 lbf. for exterior hinged doors and 8 lbf. for interior hinged and sliding or folding doors. If the 15 lbf. is exceeded, an automatic assist or an automatic door opener shall be installed on at least one door at the major accessible entrance to the building or facility. The force shall be applied perpendicular to the door at the door push/pull, or 2'-6" from the hinged side of the door, whichever is the furthest distance from the hinge, or parallel to the door at the door opener side of sliding or folding doors.

The force required to open a fire door shall be 12 lbf. or the minimum force necessary to assure the complete closing and latching of the fire door.

4.1.14 Door closers shall comply with the requirements of Door Controls—Closers' ANSI A156.4—1972.

4.1.15 If a door closer is required, then the closing period shall be adjusted so that the door will close in a minimum of 3 seconds from an open position of 70 degrees. Closers shall have a delay feature keeping the door open for a minimum of 5 seconds before beginning to close.

4.1.16 Automatic swing doors shall not open into passing pedestrian traffic unless suitable guard rails or other protective methods detectable by the long cane technique are used to protect passers-by from the swing of the door. Automatic sliding doors are preferred.

4.1.17 Where automatic doors are opened with manually operated pressure plates, these plates shall be located on the push/pull (lock) stile of the door within 4'-0" of the door jamb and located no higher than 3'-4" from the floor surface.

4.1.18 Where floor to ceiling or floor to floor glass walls are used at the entrance level, care shall be taken to insure that the partially sighted and blind have sufficient tactile indication of the entrances.

DOOR HANDLES

4.2 Doors shall be operable without movements requiring a tight grasp, complex hand movements, or the exertion of great force. Automatic doors shall be safe and usable by the majority of people, including the handicapped.

4.2.1 All manual door openers shall have a lever design or other shape which does not require grasping and twisting of the wrist as the only means of operation. They shall be mounted 3'-0" to 3'-8" from the floor surface to the center of the actuating portion of the device.

4.2.2 Manual door openers shall be designed with no sharp corners or edges. The opener shall be chosen that minimizes the catching of clothes on the device.

4.2.3 Clearance between the handle and the door shall be a minimum of 2' to allow the door to be pulled open by using the arm.

4.2.4 Where door push plates are an integral part of the door stile, the push plate shall be of a contrasting color.

4.2.5 Where the door opening device is a bar extending from stile to stile, the side of the bar to be pulled or pushed shall be distinguished with a change of color and texture.

4.2.6 The hardware provided for doors into fire stairs, fire corridors or exits and hazardous areas, e.g., electrical switchrooms, shall be provided with a change in texture, either by knurling or by applying an abrasive finish to the handle, see Section 12.2.3, Emergency Warning Signals and Alarms.

4.3 DOOR SIGNS

4.3.1 For door signs, see Section 12.1, Signage.

5.1 INTERIOR CIRCULATION ROUTES

There shall be an accessible and convenient path of travel from accessible entrances to all accessible areas within a building or facility. There shall be accessible means of emergency egress or a place of refuge in an emergency from all accessible spaces within a building or facility.

5.1.1 All accessible spaces in a building or facility shall be served from an accessible entrance by at least one path of travel that does not have stairs or escalators.

5.1.2 Every accessible space shall be served by a path of travel that does not have stairs or escalators to at least one means of egress or refuge in an emergency. The following alternatives are acceptable:

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a. A horizontal exit shall be provided that meets the requirements of the American National Standard Code for Life Safety from Fire in Buildings and Structures, ANSI. A. 9.1—1974 (NFPA 101—1973) for horizontal exits; or

b. The elevator lobbies shall be separated from the other portions of the building by construction having a fire-resistive rating of not less than two hours, have positive pressurized elevator shafts with the elevators capable of being operated by a separate emergency power system provided, and have at least one elevator made available for use by authorized people to assist the handicapped; or

c. Elevators shall meet requirements of administrative authorities as approved means of egress, and have an approved evacuation plan in the case of an emergency; or

d. Stairways required as means of egress shall have accessible landings at floor levels with spaces that have at least 10 sq. ft. of clear floor area in addition to that required for exiting. This space shall be accessible to, and have a configuration that will accommodate one wheelchair in positions that do not obstruct people exiting. Stairways, and access to them, shall provide a protected enclosure no less restrictive that the requirements of ANSI. A. 9.1—1974 (NFPA 101—1973, Section 5-114).

5.1.3 All drinking fountains, public toilet rooms, fire alarms, vending machines and public telephones shall be located adjacent to accessible paths of travel and shall meet the applicable requirements of this standard.

5.1.4 The minimum clear width of halls, corridors, passageways and aisles shall be 3′-0″. Where there is likelihood of there being several persons in wheelchairs in a building, the minimum width of halls, corridors, passageways and aisles shall be 5′-0″ to allow wheelchairs to pass.

5.1.5 Stairways shall not lead directly into or out of a path of travel, unless a tactile warning is provided. See Section 6.2.4, Stairs.

5.1.6 No rigid or hard object shall project into the space above a path of travel unless the dimension from the bottom edge of the object to the walk surface is at least

7'-6". Below this height, protruding objects which project more than 4" from a wall or column must:

a. continue to the floor; or

b. to within 8" of the floor; or

c. be located in protected areas which are recessed or enclosed by wing walls. Such a protected area shall have a contrasting floor texture and color.

d. Doors and door closers do not have to conform to this requirement.

e. Where low ceiling heights prohibit the placing of Emergency Exit signs at 7'-6" above the floor level, these signs may be placed at 6'-6" from finished floor level to the bottom of the sign.

6.1 RAMPS

If possible, alternative design solutions to ramps should be provided because of the substantial energy demands required to negotiate them by those in wheelchairs, plus the difficulties encountered by amputees and others with gait problems on ascent and descent. Stairs or elevators should be provided in addition to ramps. Ramps shall allow unrestricted traffic flow, and be free of hazards. All ramps constructed in a building or facility and site shall meet the requirements of this standard.

6.1.1 Any part of a circulation path shall be considered a ramp if it has a slope that is greater than 1:20. All ramps in a rampway shall have identical slopes. A slope of 1:20 is preferred for ramps of all lengths. The maximum slope of ramps shall be 1:12 in new construction. Ramps of 1:8 and 1:10 may be used where existing physical constraints prevent the construction of more gradually sloped ramps.

6.1.2 All ramps occurring along a permanent accessible path of travel or fire exit shall be of permanent fixed construction.

6.1.3 Exterior ramps shall not begin or end in an area where standing water will accumulate on the walking surfaces.

6.1.4 Weepholes in retaining walls abutting exterior ramps shall not drain across the surface of the ramp.

6.1.5 All ramps with a rise greater than 9", except curb ramps, shall have handrails on both sides. The handrails shall be 2'-6" to 2'-10" in height, measured vertically from the surface of the ramps, and shall extend at least 1'-0" beyond the top and bottom of the ramp segment. Handrails shall be continuous along the rampway. If children are principal users of the building, then a second set of handrails shall be provided at a height of 2'-0". Handrails shall comply with Section 6.3, Handrails and Guardrails.

6.1.6 Wheelchairs, walking aids and feet shall be protected from slipping off the edges of the ramp.

6.1.7 Ramps shall have a minimum clear width of 3'-0". Where passing of wheelchairs can be expected on the ramp, the minimum clear width shall be 5'-0".

6.1.8 Ramps shall have level platforms at the bottom and the top of each run, at least 5'-0" long and be at least as wide as the ramp. Intermediate platforms shall be 3'-0" minimum between each ramp segment.

Intermediate platforms shall be a minimum of 5'-0" deep and 8'-0" wide to allow wheel chair maneuvering through 180°, and at least 5'-0" deep and 4'-0" wide for turns of 90°.

6.1.9 If doorways are located at the platforms, the area in front of the doorway shall comply with Section 4.1.1 Doorways. If doors open out onto the ramp platform, a level area at least 5'-0" deep and 5'-0" wide shall be provided.

6.1.10 The ramp surface shall be slip resistant. See Section 13.1.5, Ground and Floor Surfaces.

6.1.11 No object shall be hung from above or the sides that project into a rampway lower than 7'-6" from the surface of the ramp or landing. Below this height, no object shall project into a rampway other than the handrails.

6.2 STAIRS

6.2.1 Stair risers shall be no less than 4" high nor more than 7" high, measured from tread to tread. The minimum width of the tread shall be 11" from nosing to nosing.

6.2.2 All risers and treads shall have uniform dimensions on any given flight of stairs.

6.2.3 Stair treads shall not have abrupt or squared nosing configurations. The maximum nosing projection shall be 1 1/2". The radius of curvature at the edge of the tread shall be no greater than 1/2". The edge of the nosing shall be clearly distinguishable, see Section 13.1.4, Ground and Floor Surfaces.

6.2.4 Where a stairway intersects a circulation path at right angles, the first riser shall be set back at least 2'-6" from the circulation route. Tactile warning cues for the blind shall be located from the edge of the path of travel to the top nosing of the stair, see Section 12.3, Tactile Floor Surface Alerts.

6.2.5 Stair treads shall have surfaces which are non-slip, see Section 13.1.4, Ground and Floor Surfaces.

6.2.6 Stairs shall have continuous handrails at both sides, and shall be located 2'-6" to 2'-10" measured vertically from the surface of the tread. Where children are the principal users of a building, a second set of handrails shall be provided at a height of 2'-0" measured vertically from the surface of tread. Handrails shall extend a minimum of 1'-0" beyond the top riser and 1'-0" plus the tread width beyond the bottom riser. The extension shall be parallel with the landing floor surface. Handrails shall comply with Section 6.3, Handrails and Guardrails.

6.2.7 Exterior stairs shall not begin or end in an area where standing water will accumulate on the walking surfaces.

6.2.8 Weepholes in retaining walls abutting exterior stairs shall not drain across the surfaces of the treads.

6.2.9 No object shall be hung from above or the sides that project into a stairway lower than 7'-6" from the surface of any tread or landing, measured vertically. Below that height no object shall project into a stairway other than handrails, stair stringers and door hardware.

6.2.10 When a circulation space occurs beneath a stair, a barrier shall be provided to prevent persons from hitting their heads on any part of the stair. Any part of the flight of stairs occurring below a height of 7'-6" measured to the floor shall be so protected.

6.3 HANDRAILS AND GUARDRAILS

6.3.1 Handrails shall be designed to permit continuous sliding of hands. The hardware chosen for attaching handrails to balusters or walls shall be such that no projecting lugs, devices, or other construction elements shall interrupt the continuous sliding of the hand, or engage loose clothing.

6.3.2 The anchoring of posts and framing of members for handrails and guardrails shall be of such construction that the completed structures shall be capable of withstanding a load of at least 250 lbf. applied in any direction at any point on the top rail.

6.3.3 Handrails shall be designed to allow the natural opposing grip. The outside diameter or width of the rails shall be 1 1/4" to 1 1/2".

6.3.4 Handrails and guardrails, including fasteners, shall have no sharp edges or dangerous protrusions. Edges shall have a minimum radius of 1/8".

6.3.5 Handrails shall have a maximum clearance of 1 1/2" between the rail and the wall. When the surface of the wall is rough, e.g., concrete or masonry, protection shall be required behind the handrail to prevent knuckles being scraped on the wall surface, except in fire-stairs and buildings with alternate methods of vertical circulation.

6.3.6 Projecting ends of handrails or guardrails shall return smoothly to the wall, floor or post.

6.3.7 A raised star, 5/8" high and raised 1/32", shall be placed on the top surface of the handrails of enclosed stairs at the main exit floor.

6.3.8 Every stairway required to be more than 7'-4" wide shall have intermediate handrails dividing the stairway into portions not more than 7'-4" wide.

6.3.9 All unenclosed floor openings, and open sides of landings, balconies, accessible roofs or porches shall be protected by guardrails which shall not be less than 3'-6" in height. This requirement does not apply to the loading side of loading docks. The height of the guardrail may be lowered in the following conditions. Where guardrails are required within individual dwelling units, the height of the guardrail may be 3'-0". The guardrail on a balcony immediately in front of the first row of fixed seats and which are not at the end of an aisle may be 2'-2" in height.

6.3.10 Handrails and guardrails shall be designed so that the area in the plane of the handrail or guardrail, from the top of the tread or floor surface to the underside of the rail, shall be filled with balusters, intermediate rails, ornamental closures or panels which shall not allow the passage of a sphere exceeding 5" in diameter except any triangular opening formed by a tread, riser and bottom edge of a continuous rail, if that bottom edge is no more than 2" above the nosing. In areas of commercial or industrial type occupancies which are not open to visitors or children the open space between intermediate rails may be increased such that a sphere of 10" in diameter cannot pass through, and the open space between balusters may be increased such that a sphere of 6" in diameter cannot pass through.

7.1 ELEVATORS

All passenger elevators and elevator lobbies shall be accessible. Elevators shall comply with the American National Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, ANSI A17.1—1971.

7.1.1 Elevator lobbies shall be located adjacent to direct and accessible paths of travel from the entrance and all major areas of the building. Directional signs shall be provided when the elevator location is not obvious, see Section 12.1, Signage.

7.1.2 No rigid, hard object shall project into the elevator lobby space unless the dimension from the bottom edge of the object to the floor surface is at least 7'-6". Below this height, protruding objects which project more than 4" from a wall or column must:

a. continue to the floor; or

b. to within 8" of the floor; or

c. be located in protected areas which are recessed or enclosed by wing walls. Such a protected area shall have a contrasting floor texture and color.

d. Doors and door closers do not have to conform to this requirement.

7.1.3 The floor surface of the lobby shall meet the requirements of Section 13.1, Ground and Floor Surfaces, to provide a surface that provides easy maneuverability for those in wheelchairs.

7.1.4 All elevator hoistway entrances shall have floor designations provided at each jamb. The centerline of these characters shall be located 5'-0" from the floor. The size of the characters shall be a minimum of 2" high and shall be raised at least 1/32". The character shall be of a contrasting color with the surface on which it is mounted, preferably a light color on a dark background. Permanently applied plates are acceptable.

7.1.5 All elevator lobbies shall have the call buttons located so that the centerline of the buttons is 3'-6" from the floor surface. Where only one call button is required, the mounting height shall be 3'-6" to the center of the button. Call buttons at the main entrance and transfer floors shall be identified by a sign indicating the floors served by such elevators. This sign shall have characters raised at least 1/32" from the surface, have sharply defined edges, and shall be at least 1/2" high. The characters shall be a contrasting color to the background, preferably a light color on a dark background.

7.1.6 All hoistway entrances shall have visible and audible signals to indicate an approaching car and its direction of travel. The centerline of the visible signal shall be a minimum of 6'-0" from the lobby floor. Arrow shapes for directional indication to be consistent with the direction of travel of the elevators shall be used. Each symbol shall be 2 1/2" high. They shall be visible from the proximity of the lobby call buttons. The color white shall be used for the "up" symbol and red shall be used for the "down". Audible signals shall sound once for the "up" elevator and twice for the "down" elevator. The use of in-car lanterns are acceptable, and they shall be visible from the area in front of the call button.

7.1.7 The minimum acceptable time from visual and audible notification that a car is answering a call until the doors of that car start to close shall be calculated from the following equation:

$$T = \frac{D}{1.5\ \text{ft./sec.}}$$

Where T = total time in seconds
Where D = distance in feet from a point in the center of the lobby or corridor (maximum 5'-0") directly in front of the furthest call button to the centerline of the hoistway door.

For cars with in-car lanterns, T begins when the lantern is visible.

7.1.8 The minimum time in response to car calls for elevator doors to remain fully open shall be 3 seconds. Door reopening devices shall remain effective for a period of at least 20 seconds. After this time, doors may close in accordance with ANSI Safety Code for Elevators, Dumbwaiter, Escalators and Moving Walks—A17.1—1971.

7.1.9 The elevator operation shall be automatic and each car shall be provided with a self-leveling feature which will automatically bring the car to the floor landings within a tolerance of + 1/2" under rated loading to zero loading conditions. This self-leveling feature shall, within its zone, be entirely automatic and independent of the operating device, and shall correct for overtravel or undertravel.

7.1.10 The minimum clear door width shall be as specified in Table 7.1.12, Standard Sizes of Accessible Elevator Cars.

7.1.11 Elevator doors shall open and close by automatic means. They shall be provided with a reopening device which will stop and reopen a car door and adjacent hoistway door automatically if the door is obstructed by an object or person while closing. The reopening device shall be capable of completing these operations without requiring contact for operation if the object or person passes through sensing devices located at a height of 5" and 2'-5" from the floor.

7.1.12 The floor plan of elevator cars shall allow people in wheelchairs to enter and leave the car, and space to maneuver to reach the controls. The minimum acceptable inside dimensions of cars of standard sizes are shown in Table 7.1.12.

TABLE 7.1.12
Standard Sizes of Accessible Elevator Cars

Capacity Lbs.	Width w	Depth d	Clear Door Width Side Opening	Center Opening
1500*	4'-6"	4'-3"	2'-8"	—
2000**	5'-8"	4'-3"	3'-0"	—
2500	6'-8"	4'-3"	3'-6"***	3'-6"
3000	6'-8"	4'-7"	3'-6"***	3'-6"
3500	6'-8"	5'-3"	3'-6"***	3'-6"
4000	7'-8"	5'-3"	—	4'-0"

*Does not permit a wheelchair to turn around, and shall only be used in existing buildings.
**Does not permit a wheelchair to turn around.
***Accommodates a 6'-0" x 2'-0" stretcher in the horizontal position.

7.1.13 In buildings over three stories, one elevator shall be installed with the capability of carrying an ambulance stretcher of 6'-0" without tilting it to gain access.

7.1.14 The location of elevator controls shall comply with the requirements and be readily accessible from a wheelchair upon entering an elevator. Raised characters shall be 1/2" high and raised 1/32" from the surface, have sharply defined edges, and contrast in color with the face plate. Permanently applied plates are acceptable. Raised characters shall be to the left of the buttons. Emergency controls shall be grouped at the bottom of the control panel and be 2'-11" from the floor level to the center of the emergency button. The highest floor buttons shall be no higher than 4'-6" from the floor level to the center of the buttons. When two rows of buttons are required, odd numbers shall occur on the left hand side and even numbers on the right hand side. Where three rows are necessary, the buttons shall be numbered from the bottom, left to right. A blank button shall be required for floor 13, when that floor identification does not occur in the building (for superstitutious reasons). Raised buttons are preferred, but recessed buttons are acceptable providing the recess does not exceed 1/4". The minimum size of the button shall be 3/4", not including any lighting around the button. Visual indication shall be provided to show each call registered and extinguished when that floor is reached. Standard symbols shall be used to designate essential controlls.

7.1.15 A car position indicator shall be provided above the car control panel or over the opening in each car to show the position of the elevator in the hoistway. As the car passes or stops at floors served by the elevator, the corresponding numeral shall illuminate and an audible signal shall sound. Numerals shall be a minimum of 1/2" high. The audible signal shall be no less than 20 dB. An automatic verbal annunciation of the floor number at which the car stops may be substituted for the above audible signal, and is preferred.

7.1.16 Handrails shall be provided on the side walls of the car, and preferably on the side and rear walls, mounted at a height of 2'-6" to 2'-8" from the floor of the car. The rail shall have 1 1/2" clearance between the wall and the rail. See Section 6.3 for handrail selection.

7.1.17 An emergency two-way communication system between the elevator and a point outside the hoistway shall be provided. If the system is normally connected to the building power supply, it shall automatically transfer to a source of emergency power within 10 seconds of the failure of normal power supply. The emergency power source shall be capable of providing two-way communication for at least 4 hours. The highest operable part of a two-way communication system shall be a maximum of 4'-0" from the floor of the cab. The location of the communication system shall be identified with a raised symbol adjacent to the device. A system without handset is preferred. A light shall also be provided to signal to any deaf person who may be trapped in an elevator when his emergency call has been answered.

7.1.18 There shall be no sharp edges or rough surfaces in the elevator car or hoistway opening.

7.1.19 The floor finish shall be slip resistant, see Section 13.1, Ground and Floor Surfaces. When carpet is used in the car, it shall be laid without underlay, securely attached to the floor and have a tight weave and low pile. Uncut pile is preferred.

7.1.20 The gap between the threshold of the elevator car and the lobby floor (running clearance) shall be no wider than 1 1/4".

7.1.21 The minimum illumination at the car controls, car threshold and landing sill shall be at least 5 footcandles.

7.1.22 Where remodeling is taking place, and an existing elevator will not permit a wheelchair to turn, the control panel shall be relocated on the side wall, and not in the door wall. A mirror shall be placed on the wall opposite the door, so the floor position indicator will be reflected and be visible to a person sitting in a wheelchair, or a second floor position indicator shall be installed in the rear wall.

8.1 PUBLIC TOILET ROOMS

Buildings required by code to have toilet facilities shall have accessible and usable toilets and related fixtures for use by disabled people. Design and location of personal hygiene facilities shall provide the same conditions and privacy for all users. Each public toilet room shall have one accessible water closet and related facilities.

8.1.1 Toilets shall be located adjacent to acessible circulation paths and comply with the requirement of Section 5.1, Interior Circulation Routes. Visual and tactile directions shall be given in circulation areas, and comply with the requirements of Section 12.1, Communication and Identification.

8.1.2 The symbol and/or name on the toilet room door shall be raised at least 1/32" from the surface. The characters shall be at least 2 1/2" high and shall be mounted 4'-6" to 5'-0" from the floor surface. The symbol or character shall be in a contrasting color from the background, see Section 12.1.4, Communication and Identification.

8.1.3 Toilet room doors shall have a minimum clear width of 2'-8", smooth surfaces, preferably no threshold, and at least 1'-6" clearance at the handle side of the door for wheelchair maneuvering, see Section 4.1, Entrances, Doors and Doorways. Where door vents are required, they shall be located so that they will not interfere with the drive rim or footrests of wheelchairs, see Section 2.3.1, Dimensions of Wheelchairs. Door Handles shall meet the requirements of Section 4.2, Door Handles.

8.1.4 Where there is a passage way from the corridor/toilet entrance to the toilet room, for modesty purposes, the dimensions and configurations shall meet the requirements of Section 2.3.2, Space Requirements for Maneuvering Wheelchairs, and Figure 8.1.4. There shall be no abrupt change in level between the toilet room floor and corridor floor, or within any part of the toilet room. Thresholds shall be bevelled to allow wheelchair access, see Section 4.1.10, Entrances, Doors and Doorways.

8.1.5 The toilet room floor finish shall be slip resistant, particularly when wet. See Section 13.1, Ground and Floor Surfaces.

8.1.6 Where the required number of fixtures, as established by the 1976 Illinois State Plumbing Code, indicates that a single, individual toilet room is adequate, that toilet room shall comply with all the requirements for accessibility under Section 8.1, Public Toilet Rooms.

8.1.7 At least one toilet stall in every toilet room, including employee facilities, shall be usable by people in wheelchairs or who use walking aids. The accessible toilet stall shall have a minimum of 5'-0" x 5'-0" clear internal dimensions. The door shall swing out and have a 2'-8" clear opening. Opening and locking devices shall not require a pinching or twisting of the wrist to operate. Toilet stalls of minimum size shall have wall mounted water closets. Floor mounted water closets are acceptable if the depth of the stall is increased to 6'-0". Water closets shall be located 1'-6" from the right or left hand partition to the center line of the fixture. Flushing mechanisms shall be automatic or operable without extremes of bending, reaching or twisting, and shall be activated by a non-precise movement requiring a light pressure. Such toilets shall have grab bars. Grab bars shall meet the requirements of Section 14.2, Supports. The height of the toilet seat shall be 1'-5" to 1'-7", measured from the floor to the top of the toilet seat. Accessible toilets shall have toilet seats with covers. Maneuvering space in front of toilet stall door shall be a minimum of 3'-6" in width. Wall and ceiling hung partitions are preferred to floor mounted partitions.

8.1.8 Tissue dispensers shall be placed 2'-10" to the center from the rear wall on the side wall closest to the toilet bowl, and shall be mounted immediately below the grab bar.

8.1.9 Space planning of toilet rooms shall allow front approach to all lavatories, see Section 2.3.2, Space Requirements for Maneuvering Wheelchair. Clearance under all lavatories shall be 2'-6" minimum from the floor to the underside of the apron, and 2'-10" maximum to the top of the lavatory bowl. Exposed not-water pipe and drain shall be fully insulated if the water temperatures exceed 105°F. Undersurfaces of lavatories shall be smooth.

8.1.10 Faucets shall have a lever, blade, or multi-arm type handle or other design that does not require grasping or twisting of the wrist as the only means of operation. Single lever controls are preferred. Forces needed to activate the faucets should be as small as possible and shall be no greater than 3 lbf. Spring-operated faucets are not acceptable unless they meet these requirements and have a delay feature which allows the water to run for at least 10 seconds after the hand is removed from the faucet.

8.1.11 The "hot" faucet shall always be on the left-hand side of the lavatory and the "cold" faucet shall be on the right-hand side. The temperature of the hot water shall be no greater than 105°F. at the faucet.

8.1.12 There shall be sufficient floor area in front of, and under, a wall-mounted urinal to allow a wheelchair approach to bring the front edge of the seat to the lip. At least one wall-mounted urinal shall have an elongated lip and be mounted 1'-3" to 1'-5" from the floor surface to the top of the lip. There shall be at least 1'-4" clear width to each side of the center line of the urinal to facilitate wheelchair approach.

8.1.13 All mirrors shall be mounted with the bottom edge no higher than 3'-2" from the floor surface.

8.1.14 Dispensers and receptacles shall be located so that they do not interfere with circulation, shall be free from hazards, rough surfaces or sharp edges and convenient to use. Dispensers and receptacles shall be mounted so that the highest operable part shall be no higher than 3'-4" above the floor surface.

8.1.15 Dispenser controls shall not require grasping or twisting of the wrist to operate and shall be operable by nonprecise movement.

8.1.16 Hot air hand drying equipment shall be designed so that hands cannot accidentally touch the heating element. The surface temperature of any part of a hand drier directing warm air shall not exceed 105° F. Alternate methods of hand drying shall be provided where this temperature is exceeded.

9.1 DRINKING FOUNTAINS

All drinking fountains and water coolers shall be accessible.

9.1.1 Drinking fountains and water coolers shall not be located in alcoves unless the clear width of the alcove is 2'-0" for depths not exceeding 1'-7" or a clear width of 2'-8" for depths exceeding 1'-7". The head of the recess shall be no lower than 6'-8" from the floor.

9.1.2 The height from the floor to the orifice shall be 2'-6" to 3'-0". Where existing drinking fountains and water coolers have spouts above 3'-0" from the floor, they shall either have an auxiliary fountain or a spigot for cups within 3'-0" from the floor. If a spigot is provided, there shall also be a cup dispenser next to the fountain mounted no more than 3'-4" from the floor to the cups.

9.1.3 The spout of the drinking fountain or water cooler shall be at the front of the equipment, and should preferably direct the flow of water parallel to the front edge. The fountain or cooler shall allow the insertion of a 4" cup under the flow of water. The maximum volume and trajectory of the water shall be controlled by a device located to prevent adjustment by unauthorized persons, and not by the users hand control.

9.1.4 Hand controls shall be required, and shall be operable without the need for precise grasping and twisting, or pinching. A lever is preferred and a multi-arm type handle is acceptable. The force to operate shall be no greater than 3 lbf.

9.1.5 Wall mounted units shall have the front panel sloping inward to allow close side approach for wheelchairs. The panel shall slope 2" to 3 1/2" from the vertical.

9.1.6 There shall be no sharp edges or corners on drinking fountains or water coolers.

9.1.7 Exterior drinking fountains and water coolers shall be located along accessible paths of travel. Where they are located immediately alongside the accessible path, the hard paved surface shall extend at least 2'-0" beyond the equipment at both sides.

10.1 SHOWER ROOMS

10.1.1 Where showers are provided, other than residential facilities, a minimum of one of the showers for each sex shall be accessible. The accessible shower shall be a minimum of 3'-0" x 3'-0", inside dimensions. A well padded seat shall be positioned 1'-7" above the floor, and shall be hinged to fold up against the wall. Grab bars shall be installed on two walls at 1'-1" above the seat and shall meet the requirements of Section 14.2, Supports.

10.1.2 When gang-showers are provided, no individual handicapped shower need be provided unless there are curbs which prevent wheelchair access. A manually-operated wheel chair shall be provided for showering. At least one water control and flexible hand held shower spray shall be provided and meet the requirements of Section 10.1.14.

10.1.3 Shower stalls shall have a floor surface which is slip-resistant under wet conditions, see Section 13.1.6.

10.1.4 Water controls shall be of a single lever design. A flexible hand held shower spray shall be permanently installed with a hook to hold it located 3'-4" to 4'-0" above the floor surface. The hose shall be 4'-6" in length. A diversionary valve shall be installed to change the water flow from the hand held shower to the fixed head shower.

10.1.5 The temperature of hot water delivered to the shower shall not exceed 105°F.

10.1.6 The soap tray shall be no more than 3'-4" above the floor.

11.1 COIN OPERATED PUBLIC AND SEMI-PUBLIC TELEPHONES

All public and semi-public coin operated telephones shall be accessible.

11.1.1 Pay telephones shall have the highest operable part of the telephone at 4'-6" above the floor level where there is "dial-tone-first" to get the operator without inserting coins, and located to allow side access for those in wheelchairs. Where there are existing structural constraints which prevent side access, and/or there is not "dial-tone-first", one telephone in the bank shall be located with the highest operable part of the telephone at 4'-0" above the floor level.

11.1.2 Pay telephones shall be mounted on walls, free standing pylons, or in enclosures without doors. Bases and enclosures shall not impede the approaches to the equipment by those in wheelchairs. There shall be 2'-6" clearance from the floor surface to the underside of any enclosure or shelf, with the exception of telephones mounted at 4'-0" from the floor to the highest operable part.

11.1.3 Pay telephones shall not be located so they are hazards in circulation routes.

11.1.4 Entrances to telephone enclosures shall have a clear width of at least 2'-6".

11.1.5 Telephones and supporting equipment shall be located on hard surfaces, large enough to allow wheelchairs to maneuver in front and at both sides, see Section 2.3.2, Space Requirements for Maneuvering Wheelchairs.

11.1.6 Telephone books, if provided, shall be located in a way that allows access and use by persons in wheelchairs. Loose books, if provided, shall be equipped with a tether.

11.1.7 Coin-operated telephones shall have push button controls where this service is available.

11.1.8 The length of the cord from the telephone to the handset shall be at least 2'-6".

11.1.9 To aid the visually impaired in making operator assisted calls, the operator must be able to obtain the called and calling number. This shall be accomplished by electronic means, or the telephone number shall be provided in a tactile form, either in raised numerals or with a braille equivalent placed below the buttons. The numbers shall be 1/2" high and raised 1/32".

11.1.10 At any public telephone location, such as State or civic buildings, hotels, motels, transportation terminals and stations, medical facilities, shopping centers and department stores, or where an evidenced need for an adjustable volume control is brought to the attention of the telephone company, it shall be provided and clearly marked.

11.1.11 **Telephone receivers shall generate a magnetic field in the area of the receiver cap. This is required for persons wearing hearing aids with an inductive pickup.**

11.1.12 The minimum illumination at the telephone shall be at least 5 footcandles provided by the subscriber or leasee.

12. COMMUNICATION AND IDENTIFICATION

The major purpose of communication and identification systems in the built environment is to provide people with:

a. information regarding general orientation or layout of buildings or facilities—shopping center plans, building layouts, bus routes, etc.

b. directional information to building, facilities or specific rooms within facilities.

c. identification of specific areas or rooms.

d. instructional information regarding the use of devices with buildings or facilities—banks of elevators serving different floors, telephone operation instructions, etc.

e. emergency and warning requirements—fire alarms, stop signs, emergency exits, etc.

The proportion of visitors to employees will determine how comprehensive the communication and identification systems will be. In an office building, where the ratio of employees to visitors is high, only the public areas—main entrance elevator lobbies and toilets—need signage as employees can be expected to learn access routes and the location of facilities. In a museum, a different situation occurs. An extremely comprehensive communication and identification system is required, as visitors need help in locating the building's facilities.

12.1 SIGNAGE

Where identification signs, directional signs, including maps or layouts, or informational signs are required, they shall be provided in tactile form for the blind.

12.1.1 Where directional signs are used in buildings to indicate the location of toilets, vertical circulation, room or unit numbers, or spaces with different functions, they shall be located to provide maximum visual exposure along routes of travel, especially at the intersection of circulation routes and elevator lobbies. There shall be a consistency of location and type of sign providing information throughout a building.

12.1.2 Where room identification signs and numbers are used, they shall have raised characters. These signs shall be placed in a standardized location throughout the building alongside the door at the latch side, and mounted at a height range of 4'-6" to 5'-0". Raised characters shall be raised at least 1/32", have sharply defined edges, and be at least 5/8" high.

12.1.3 Characters on emergency, directional and instructional signs shall have a stroke width to height ratio of 1:6 to 1:10, and a character width to height ratio of 3:5 to 1:1.

12.1.4 Signage shall have contrasting colors between the characters and the background, preferably a light color on a dark background.

12.1.5 Signs shall have glare free surfaces which will not interfere with legibility.

12.1.6 Signs with descriptive material about public buildings, monuments and objects of a cultural interest shall have raised letters if audio tape devices, sighted guides, or braille brochures are not available to present the identical information.

12.1.7 The International Symbol of Accessibility shall be displayed in the following places:

a. at all major entrances to a building or facility which is accessible. Directions shall be placed immediately alongside of the symbol indicating the directions to the nearest accessible entrance, if that entrance is inaccessible.

b. at the entrance to all public toilet rooms, if one is inaccessible, directions shall be placed alongside the symbol to indicate the nearest accessible toilet room.

c. at the origins of accessible paths of travel to major publicly used spaces, with directions to the nearest accessible path of travel, if all are not accessible.

d. Where signs, building layout diagrams or maps are provided, the Symbol of Accessibility shall indicate where accessible toilet rooms, entrances and elevators are located. Layout diagrams or maps shall be oriented from the standpoint of the viewer, and the viewer's position clearly indicated.

e. Where parking spaces are provided for persons who are handicapped, the Symbol of Accessibility shall be mounted on a pole or wall, facing the direction of entry, and may be accompanied by markings painted on the parking surface.

12.1.8 The Symbol of Accessibility is to be displayed.

12.2 EMERGENCY WARNING SIGNALS AND ALARMS

Emergency warning signals and alarms shall be located and designed so that they can be easily seen, heard and understood.

12.2.1 Both visual and audible emergency warning systems shall be provided. Illuminated emergency exit signs shall flash as a visual emergency alarm with a frequency not exceeding 5 Hz. Audible emergency alarms shall produce a sound level which exceeds the normal prevailing equivalent sound level at the intended listeners ears by at least 15 dB. Alarm signal sound levels shall not exceed 120 dB.

12.2.2 Visual emergency alarm devices shall be located so that the signal and/or reflection shall be seen anywhere in the space. If such systems utilize a permanently installed electrical power source, they shall be installed on the same circuit as the audible emergency alarms. Visual emergency alarm devices may also be wireless and portable, and be provided by the building owner or management for use at the request of a deaf person. If portable visual emergency alarm devices are selected, at least two shall be available.

12.2.3 Emergency exit manual door openers shall be identifiable by tactile means. These openers shall have a roughened surface on the parts of the opener that come into contact with the hand. This change of texture may be achieved by knurling or the application of an abrasive finish to the handle, and shall be standardized throughout a building or facility.

12.2.4 Areas or spaces with microwave ovens shall be identified for the benefit of people with heart pacemakers.

12.2.5 Fire alarm devices shall be located 3'-4" to 4'-0" from the floor level to the center line of the operable mechanism, and meet the requirements of Section 14.1, Controls, Dispensers and Receptacles.

12.3 TACTILE WARNING SIGNALS AND BLIND LOCATION CUES

12.3.1 Tactile warning signals on walking surfaces shall be provided when required by these Standards to alert the blind and visually impaired of possible hazards in the pedestrian path which might result in falls, or conflicts with vehicular traffic. Curb edges are an acceptable blind location cue.

12.3.2 Where tactile warning signals are required, the surface texture pattern shall be consistent within a building, facility and/or site development.

12.3.3 The tactile warning signal pattern shall only be used as an alert to hazardous situations and not used on any other walking surfaces.

12.3.4 The pattern of the tactile warning signal shall be one of the following:

a. Applied strips to the walking surface forming grooves 1/8" deep between the strips, and bonded to the surface to prevent delamination.

b. A continuous sheet material with grooves 1/16" minimum depth forming an integral part of the surface, and bonded to the surface to prevent delamination.

c. Grooves 1/8" deep cut or formed in the surface of the walkway base material.

d. A change of material from that used on the walkway to another material with grooves 1/8" deep cut or formed in the surface.

The width of the tactile warning signal, perpendicular to the grooves, shall be 2'-0" if there is a perceivable difference in hardness between the walkway and the tactile warning signal, and 3'-0" if there is no perceivable difference. See Table 12.3.4 for the comparison of hardness of walkway materials.

12.3.5 Grooves shall be 1/4" wide and spaced 3/4" to 2" apart. A random pattern is not acceptable.

12.3.6 Blind location cues shall be achieved by changes in surface textures on the walkway to help blind people orient themselves and/or locate building elements such as entrance doors, drinking fountains, pay telephones, etc., as required in these Standards. Blind location cues shall not be the same as tactile warning signals. Change in the hardness of the materials or change in surface textures are acceptable. Textural changes shall not result in obstruction to the caster wheel of wheelchairs, or tripping hazards.

12.3.7 To provide advance warning of curb ramps, the surface of the ramp shall have a change in texture and color from that of the surrounding walk.

12.3.8 Tactile warning signals and blind location cues shall have a contrasting color to the walkway surface color to aid the visually impaired.

12.3.9 A textured strip shall be used as a blind location cue:

a. Where vehicular and pedestrian areas abut at a common surface, and no other physical barrier is provided.

b. Where lines are painted on surfaces to define a pedestrian walk, such as through a parking lot, it shall be applied on both sides of the walk.

c. Where oblique pedestrian crosswalks occur.

The strip shall be continuous along the hazard, shall be 4" wide and shall be composed of either 1/4" maximum size gravel embedded in epoxy cement, or a resilient surfacing material applied to the surface, not thicker than 1/4" and textured.

13.1 GROUND AND FLOOR SURFACES

Ground and floor surfaces shall not present slipping hazards to ambulatory and semi-ambulatory people, nor present obstacles to the movement of people in wheelchairs.

13.1.1 Outdoor ground and walk surfaces in accessible areas shall not have large or continuous areas of small unit components, such as brick or stone, unless they are laid on a firm and stable base, the joints are flush with adjacent surfaces and they are not more than 1/2" wide.

13.1.2 Small unit components, such as brick, shall not be used on stairs unless the edge of the tread is of a contrasting color and clearly distinguishable from any joints.

13.1.3 Carpet laid on floor, stair, or ramp surfaces shall be securely attached, have a tight weave, low pile and firm underlayment. No underlayment and an uncut pile is preferred, especially in circulation routes.

13.1.4 Heavily patterned carpet, especially designs incorporating stripes, shall not be used on stairs.

13.1.5 Exposed edges of carpet shall be fastened to floor surfaces with trim along the entire exposed edge. Carpet trim shall be bevelled with a slope no greater than 1:2.

13.1.6 All floor finishes shall be slip resistant, firm and stable. The friction coefficient of the surface shall be no less than 0.5 wet or dry, when measured by static means using the Underwriters' Laboratories Friction Test Method/Card Data Method No. UL 239, employing the James Machine.

14.1 LOCATION OF CONTROLS, DISPENSERS AND RECEPTACLES

14.1.1 All controls, dispensers, vending machines and receptacles shall be located so that people in wheelchairs can position themselves within reach of operable parts, see Section 2.3.1, Wheelchair Dimensions and Section 2.3.2, Space Requirements for Maneuvering Wheelchairs.

14.1.2 Where side access for those in wheelchairs is possible, the highest operable part of controls, dispensers, vending machines and receptacles shall be located a maximum height of 4'-6" from the floor to the center of the operable part of the device. When location allows forward access only for those in wheelchairs, the maximum height of the highest operable part from the floor to the center shall be 4'-0". In toilet rooms and restrooms, dispensers and receptacles shall be mounted with their highest operable part no more than 3'-4" above the floor surface, see Section 8.1.14. Fire alarm pulls or buttons shall be located 3'-4" to 4'-0" from the floor level to the center of the device, see Section 12.2.5 Emergency Warning Signals and Alarms.

14.1.3 Controls shall not require tight grasping or pinching to activate. Forces required to activate controls shall be as small as possible and shall not exceed 3 lbf. Push button, solenoid type controls are preferred over pull type mechanisms. Click stop controls are preferred where a range of operations are controlled by a single control device.

14.1.4 Controls, dispensers and receptacles shall not require the use of two hands or two simultaneous movements by one hand to operate.

14.1.5 Slots shall be designed to allow for the insertion of coins, tickets or cards in an imprecise manner.

14.1.6 There shall be a minimum illumination of 5 foot candles at all controls, dispensers and receptacles.

14.2 SUPPORTS

Supports consist of grab bars, handrails, guardrails, railings and other devices which provide support or assistance to people. Supports shall be strong, safe and easy to use.

14.2.1 Supports, fasteners and mounting devices shall withstand a load of at least 250 lbf. applied anywhere along the length of the support.

14.2.2 The outside diameter or width of supports shall be 1 1/4" to 1 1/2".

14.2.3 Supports mounted next to a wall shall have a clear space of 1 1/2".

14.2.4 If projecting ends of supports are hazardous to passersby, they shall return smoothly to wall, floor or supporting surface.

14.2.5 Supports shall have no sharp edges or dangerous protrusions, including the fasteners. Edges shall have a minimum radius of 1/8".

14.3 ELECTRICAL FIXTURES AND CONTROLS

14.3.1 Electrical outlets shall be mounted at a minimum of 1'-0" above the floor as measured to the centerline of the outlet. For mounting height of switches, thermostats, alarm devices and other controls, see Section 14.1, Location of Controls, Dispensers & Receptacles.

14.3.2 Light switches and thermostats shall not require grasping or pinching in order to activate.

14.3.3 Light switches in hotels and motels shall be illuminated in the bathroom, bedroom and in the hallways between the bathroom and bedrooms.

14.3.4 Electrical outlets, switches and controls shall not be mounted immediately above sinks or lavatories, nor located in shower and tub recesses.

14.4 PLUMBING FIXTURES

14.4.1 All exposed pipes below 4'-0" from the floor that exceed a temperature of 105° F., shall be thermally insulated.

14.4.2 There shall be no sharp or abrasive surfaces under sink or lavatory bowls.

14.4.3 Faucets shall be of a lever design or other designs that do not require grasping or twisting of the wrist as the only means of operation. Single lever mixing type faucets are preferred. Forces needed to activate the faucets shall be as small as possible and shall be no greater than 3 lbf.

14.4.4 For detailed requirements for accessible water closets, lavatories, drinking fountains, shower rooms and bathrooms see Section 8.1, Public Toilets, Section 9.1, Drinking Fountains, Section 10.1, Shower Rooms, Section 16.1.5, Minimum Size Bathrooms Layouts, Section 16.2.4, Minimum Size Hotel Bathrooms Layouts, and Section 16.4.2, Minimum Size Health Facility Bathroom Layout.

15.1 APPLIANCES FOR PUBLIC USE

15.1.1 If appliances are provided for public use in apartment buildings, hotels or motels, etc., they shall be located in accessible rooms and at least one of the appliances shall have all controls and compartments within reach of a person in a wheelchair. Dispensers shall be located so that the highest operable part is 3'-4" to 4'-0" from the floor surface.

15.1.2 Automatic washing machines and clothes dryers accessible to a person in a wheelchair shall be the front loading type. They shall be installed so that loading and unloading of clothes can be accomplished within the reach of a person in a wheelchair, see Section 2.3.3, Reaching from a Wheelchair.

15.1.3 Unit air conditioners shall be installed so that all controls and adjustments that are essential for consumer use are within reach of a person in a wheelchair, and mounted no higher than 4'-0" from the floor to the center of the operable mechanism, see Section 14.1, Location of Controls, Dispensers and Receptacles.

16 ADDITIONAL REQUIREMENTS FOR SPECIFIC BUILDING TYPES

The specific requirements for these building types shall not be considered as exempting them from other requirements of these Standards.

16.1 RESIDENTIAL STRUCTURES

All publicly and privately owned residential structures shall conform to the following requirements except single family and two family residences and the second and third floors of apartment buildings not served by elevators. These are minimum requirements and do not satisfy the requirements for specialized housing built expressly for the handicapped or elderly.

16.1.1 All areas open to and useable by the public, both externally and internally, shall comply with the requirements of this Standard. This includes site facilities, lobbies, laundries, game rooms, parking garages, etc.

16.1.2 Doors into all dwelling units and doors or openings into any room or space within the dwelling unit shall have a minimum clear width of 2'-6". See Section 4.1, Entrances, Doors and Doorways. Reach-in closets or reach-in storage spaces are excluded.

16.1.3 Hallways and corridors within the dwelling unit shall have a minimum clear width of 3'-6".

16.1.4 Kitchens which have a U or L shaped cabinet layout shall have a minimum clear opposite wall. Kitchens with countertop along one side only shall have a minimum clear width of 3'-4" between the countertop front edge and the opposite wall.

16.1.5 Bathrooms shall be designed so that the door can be closed when a person in a wheelchair is using the room. This can be accomplished by opening the door out, using a sliding or solid folding door, or providing sufficient space in the room to allow an inswinging door to pass the wheelchair.

16.1.6 Structural reinforcement, where bathroom walls are of stud construction, shall be provided for future installation of grab bars. Grab bars shall be purchased and installed by the resident to meet individual particular needs. Reinforcement shall be provided in each wall adjacent to the tub and/or shower, and water closet and shall be located 2'-10" to the center line of the reinforcing member. The reinforcement shall be capable of supporting 250 lbf. load transferred from the grab bar.

16.1.7 All hardware shall meet the requirements of Section 4.2, Door Hardware, and all controls shall meet the requirements of Section 14.1, Location of Controls, Dispensers and Receptacles.

16.2 HOTELS, MOTELS

16.2.1 All public space in hotels and motels shall be accessible and meet the applicable requirements of this Standard.

16.2.2 The doorways to all rooms, including bathrooms, shall be a minimum of 2'-8" clear width, see Section 4.1.5, Entrances, Doors and Doorways.

16.2.3 The number of bedrooms with bathrooms to be fully accessible to handicapped persons in wheelchairs shall be based on Table 16.2.3. This requirement shall apply only to hotels and motels with 20 or more units. In walkup arrangements the accessible units and spaces used in common shall be located on ground level. In hotels with elevators, the accessible units shall be located close to the elevator.

TABLE 16.2.3
Number of Rooms in Hotels and Motels Fully Accessible to Those in Wheelchairs

Total Number of Rooms	Number of Accessible Rooms and/or Suites
0-100	1 for each 25 or fraction thereof
101-200	5
over 200	6, plus 1 for each 100 or fraction thereof over 200

16.2.4 Fully accessible bedrooms shall have bathrooms that meet the minimum requirements, including the installationof grab bars.

16.2.5 A visual emergency warning system shall be provided for use in all sleeping rooms or suites. This system may be a permanent installation in all rooms or may be a portable device provided by the hotel or motel to be installed in a room or suite as needed on request of a deaf person, and shall meet all the requirements of Section 12.2, Emergency Warning Signals and Alarms. At least two portable visual emergency warning devices shall be available.

16.3 EDUCATIONAL BUILDINGS, LIBRARIES AND MUSEUMS

16.3.1 If facilities are intended for use specifically for students which may include disabled users under 12 years of age, the following criteria shall be used:

a Toilet grab bar size	1¼" with 1½" space between grab bar and wall.
b Toilet grab bar height	mounted 10" above the seat
c Toilet grab bar length along-side the water closet	3'-0" with 1'-6" length extending beyond the front edge of the water closet.
d Grab bar must be capable of supporting a 150 lbf. load applied anywhere along the length. Connections must also be capable of supporting a 150 lbf. load.	
e Toilet height	1'-3" to top of seat from floor surface
f Lavatory height	2'-5" below apron to floor surface
g maximum height of controls receptacles and dispensers	3'-4" from center of operable part to the floor
h Height of handrails	2'-0" to the center of the bar from the floor surface
i Height of water fountain spigot	2'-6" from the floor surface
j Height of telephone to highest operable mechanism	3'-8" from the floor surface

16.3.2 All spaces in educational facilities used by students, faculty and staff shall be accessible and meet the requirements of this Standard.

16.3.3 Two percent, or a minimum of two lockers in every room where lockers are provided, shall be accessible to people in wheelchairs and shall be located within a range of 9" to 4'-0" from the floor, and have a minimum clear space in front of 3'-6". Accessible circulation routes to the lockers shall comply with Section 2.3.2, Space Requirements for Maneuvering Wheelchairs.

16.3.4 Where showers are provided, at least one shower for each sex shall be accessible to people in wheelchairs and meet the requirements of Section 10.1, Shower Rooms.

16.3.5 In laboratories and other work or study areas provided with fixed work countertops, there shall be a handicapped station having a 2'-6" clear space below the work top extending to the floor. The minimum clear space beneath the handicapped station shall be 3'-0" wide and 2'-0" deep. The clear aisle width between work tops shall be 3'-0".

16.3.6 Aisles between fixed stacks in libraries shall be 3'-6" with the exception of existing or remodeled facilities in which aisle spaces are restricted by existing multi-tiered stack structural systems which must be maintained throughout the building.

16.3.7 When remodeling existing buildings, it may be impossible to make all rooms accessible, but resource rooms, libraries, locker rooms, showers, gymnasia, or other rooms with special equipment shall be made accessible or relocated on an accessible floor. Where specialized rooms, such as science laboratories, are duplicated in a building or facility, at least one room shall be made accessible, unless all the equipment is not available in that room, in which case all rooms required to teach the full course shall be made accessible.

16.3.8 In museums every building level with displays open to the public shall be accessible to the handicapped. A reliable information source shall be located adjacent to the main entrance to give audible and visual directions and information for people who have severe auditory or visual impairment. The source should provide full information for use of the facility by the public. Displays shall be designed so that they can be seen by a seated person.

16.4 HEALTH FACILITIES

16.4.1 All spaces used by visitors and staff shall meet the requirements of this Standard.

16.4.2 Where in-patient medical care is provided, all bedrooms and bathrooms shall have minimum clear door openings of 2'-8", see Section 4.1, Entrances, Doors and Doorways. Five percent (5%) or a minimum of 2 per floor, whichever is the greatest of patient bedrooms with bathrooms shall be fully accessible to people in wheelchairs.

16.4.3 A visual emergency warning system shall be provided for use in any sleeping room or suite. This system may be a permanent installation in all rooms or may be a portable device provided by the health care facility on request by a deaf person to be installed in a room or suite as needed, and shall meet all the requirements of Section 12.2, Emergency Warning Signal and Alarms.

16.5 TRANSPORTATION TERMINALS AND STATIONS

16.5.1 A reliable information source shall be located immediately adjacent to main entrances of transportation terminals and stations to give visual and audible directions or information to people who have severe visual or auditory impairments. The source may be a directline telephone, intercom or employee. Printed information shall be available also for speech and hearing impaired. The audible and visual source shall provide full information for use of the facility by the public. See Section 12, Communication and Identification.

16.5.2 Where floor plans or maps of the building are at entrances, such plans shall be oriented from the standpoint of the viewer and the viewer's position clearly indicated. It shall also show all vehicle embarkation and disembarkation points, entrances and exits, ticket counters, public lockers, telephones and restrooms. If not all paths of travel or restrooms are accessible the accessible paths of travel and facilities shall be labeled on the map with the International Symbol of Accessibility, see Section 12.1.8.

16.5.3 Directions to all areas shall be clearly identified as required by Section 12, Communications and Identification.

16.6 RECREATION FACILITIES

The handicapped population can enjoy the same recreational facilities that are afforded to the whole population.

16.6.1 Parking lots, toilets, showers, cabins, campsites, concession stands, craft areas, boat docks and other communal areas shall be assessible and meet the requirements of this Standard. Nature trails and paths shall be developed to allow access to people in wheelchairs, those who are semi-ambulatory and those who are visually impaired. Trails over steep or difficult terrain in wilderness areas need not be accessible, but alternate accessible routes shall be provided for the disabled to experience wilderness areas. 5% or at least 2, whichever is the greater, of all camping sites shall be accessible to those in wheelchairs by having a 12'-6" wide parking space and walk which leads to the tent locations and fire-pits, where provided. The parking and path shall be a hard surface and meet the requirements of Section 3.2, Walks and Sidewalks.

16.6.2 Swimming pools funded with public monies, beaches, zoos, botanical gardens, amusement parks, fairgrounds, bowling alleys, playgrounds, sports facilities, marinas and other recreational facilities shall be accessible to handicapped people. Where provided, all allied facilities, such as parking, horizontal and vertical circulation, entrances, toilet facilities, changing and shower facilities shall meet the specific requirements of this Standard.

16.7 AUDITORIA, ARENAS, ASSEMBLY HALLS, AND STADIA

16.7.1 In places of assembly with fixed type seating, provisions shall be made for those people who are in wheelchairs, who use crutches and/or walkers, or who are hard of hearing. This includes lobbies ticket offices, seating, stage, backstage areas, dressing rooms, showers, green rooms, etc.

16.7.2 The minimum number of spectator spaces that shall be accessible to people in wheelchairs shall be computed from Table 16.7.2.

Table 16.7.2

Number of spectator spaces required that are accessible to people in wheelchairs:

Total number of fixed seats	Number of spaces required
Up to 50	2 spaces for wheelchair users adjacent to each other.
51-400	4 spaces including 2 adjacent to each other.
401 and above	An even number of spaces not less than 1% of total number located throughout seats of all price ranges and locations.

16.7.3 Spaces provided for wheelchair users shall provide sight lines that are equal to those provided for the majority of the audience.

16.7.4 Spaces for wheelchair users shall be level, and the accessible path of travel to them shall meet all requirements of Section 5.1, Interior Circulation Routes. The route to the closest fire exit or horizontal exit shall be an accessible path of travel.

16.7.5 When more than 4 wheelchair spaces are provided, removable seats can be placed in the wheelchair spaces and removed as required.

16.7.6 The minimum number of seats at least 2'-0" wide that shall be available for people with orthotics or prosthetics shall be computed from Table 16.7.6. These seats shall be located on the aisles.

Table 16.7.6

Number of seats 2' -0" wide required for people with crutches and/or braces etc.

Total number of fixed seats	Number of 2'-0" wide seats required
up to 50	2 seats on the aisle
51-400	4 seats on the aisle
401 and above	An even number of seats not less than 1% of the total number and located on the aisle throughout seats of all price ranges and locations.

16.7.7 The minimum number of seats provided with a loop, F.M. or other type of listening system shall be computed from Table 16.7.7. These seats shall be located within 50'-0" of the stage or playing area, with a complete view so that people with hearing impairment may enjoy maximum appreciation of audible presentations by seeing facial expressions and lip movement.

Table 16.7.7

Seating required with integral listening system provided for hearing impaired.

Total number of fixed seats	Number of seats required with a listening system
up to 50	2 seats together within 50'-0" of the stage.
51-400	4 seats in two separate locations within 50'-0" of the stage.
401 and above	An even number of seats not less than 1% of the total number and located throughout seats of all price ranges and locations within 50'-0" of the stage.

16.8 SERVICE COUNTERS

16.8.1 All areas that are used for business transactions shall be accessible.

16.8.2 Where service counters exceeding 3'-0" in height are provided for standing counters, an auxiliary counter or other space suitable for the business transaction shall be provided in the immediate vicinity and provide the same services. The auxiliary countertop shall not exceed 3'-0" in height from the floor, and if required for writing purposes, as in banks, hotels, etc., then space shall be provided to allow a wheelchair to pull up below the countertop and be a minimum of 2'-6" clear to the floor, 2'-8" wide and 2'-0" deep.

16.8.3 Cafeteria lines shall meet the applicable requirements of Section 5.1, Interior Circulation Routes. In addition, the height of counters for conveying trays shall be 3'-0" maximum, and the maximum reach to any dispenser shall be within reach limitations of wheelchair users unless employees are behind the cafeteria line at all times.

16.8.4 The clear width of the circulation space paralleling service counters shall be a minimum of 2'-8".

16.8.5 Food shall be located at a maximum of 1'-8" from the edge of the counter.

16.8.6 Entry control devices shall not prevent access by handicapped persons. When turnstiles or narrow gates are required, alternate access shall be provided immediately adjacent the turnstile.

16.9 DINING HALLS—RESTAURANTS

16.9.1 Dining facilities shall meet all applicable requirements of the Standard including parking, toilets, circulation, elevators, etc.

16.9.2 Tables shall have a minimum of 2'-6" clearance under the table top to the floor surface.

16.9.3 The clear width between fixed chairs shall be a minimum of 3'-0".

16.9.4 Where microwave ovens are installed, notices shall be posted to warn, in advance, the possible hazard to those persons with heart pacemakers.

16.9.5 In restaurants where there are mezzanine levels, loggias, or raised platforms, accessibility to all spaces is not required providing the same services and decorative character are provided in spaces located on accessible paths of travel.

16.10 SHOPPING CENTERS—GROCERY STORES

16.10.1 There shall be at least one check-out point accessible to the handicapped in a wheelchair in all shops, stores, etc., having check-out aisles, and shall have 2'–8" minimum clear aisle width, and 3'-0" maximum height of the counter from the floor.

16.10.2 Any device used by stores to prevent shopping carts from leaving the premises shall not prevent access or egress to those in wheelchairs. An alternate entrance equally convenient to that provided for the ambulatory population is acceptable.

17.1 REMODELING

17.1.1 Remodeling embraces rehabilitation and renovation of exisiting buildings, including improvements, extensions, repairs, structural alteration, changes in design or layout, or changes in the occupancy of the building. Maintenance, redecoration, changes to the mechanical system, reroofing, or changes to interior landscaping shall not be included under remodeling requirements. The accessibility requirements shall be based on the amount of remodeling carried out and shall be determined by calculating the amount of interior floor area to undergo remodeling expressed as a percentage of the total interior square footage of the building.

17.1.2 If more than 50% of the interior square footage of a public building is to undergo remodeling, the entire building, including site requirements, shall conform to these Standards, to the extent shown in Table 17.1.2.

Table 17.1.2

When more than 50% of the interior square footage of the building is to be remodeled:

a. At least one accessible path of travel from a site access point to an accessible entrance or entrances (if there are several different functions occuring) shall be provided.

b. At least one accessible entrance to the building, or one accessible entrance to each function in the building where several different functions occur, shall be provided. For example, a concert hall and art gallery occurring in the same building shall have separate entrances serving each space.

c. An accessible interior circulation route to and into all publicly used spaces shall be provided. This includes horizontal and vertical circulation used by visitors and employees.

d. At least one accessible toilet for each sex on each floor shall be required for visitors and employees, where toilets are provided.

e. Accessible parking places and an accessible path of travel from the parking place to the accessible entrance shall be required, where parking is provided. The number and requirements for places for disabled drivers shall conform to Section 3.5, Parking.

f. If hardware, controls, dispensers, receptacles, stairs or other features of the building included in this Standard, but not required under Section 17.1.2a through Section 17.1.2e, are to be replaced or altered, then the requirements of the specific section of this Standard shall be followed.

17.1.3 If 25% to 50% of the interior square footage of a public building is to undergo remodeling, that part of the building which is to be remodeled shall conform to these Standards, to the extent shown in Table 17.1.3.

Table 17.1.3 **When 25% to 50% of the interior square footage of the building is to be remodeled:**

a. At least one accessible path of travel from a site access point to an accessible entrance shall be provided.

b. At least one accessible entrance which is used by the public, but shall not be an entrance used for servicing the building, shall be provided.

c. Accessible horizontal paths of travel to and into all publicly-used spaces within the space to be remodeled shall be provided. If the building has elevators, the controls in these elevators shall meet the requirements of Section 7.1, Elevators, and have accessible paths of travel from the lobby to the areas that are to be remodeled.

d. At least one accessible toilet for each sex shall be required for visitors and employees where toilets are provided. In buildings over 4 floors, there shall be one accessible toilet for each sex for every four floors. These toilets shall be on accessible paths of travel from the elevator lobby and shall be marked with the International Symbol of Accessibility on the corridor side of the door.

e. Accessible parking places and an accessible path of travel from the parking places to the accessible entrance shall be required where parking is provided. The number and requirements for places for disabled drivers shall conform to Section 3.5, Parking.

f. If hardware, controls, dispensers, receptacles, stairs or other features of the building included in this Standard, but not included under 17.1.3a through 17.1.3e, are to be replaced or altered, then the requirements of the specific section in this Standard shall be followed.

17.1.4 If less than 25% of the interior square footage of a public building is to be remodeled, the building shall be made basically accessible, and conform to these Standards to the extent shown in Table 17.1.4.

Table 17.1.4

When less than 25% of the interior square footage of the building is to be remodeled:

a. At least one accessible path of travel from a site access point to an accessible entrance shall be provided.

b. At least one accessible entrance which is used by the public, but shall not be an entrance used exclusively for servicing the building, shall be provided.

c. At least one accessible toilet for each sex in the building off an accessible path of travel shall be required, if toilets are provided.

d. If hardware, controls, dispensers, receptacles, stairs or other features of the building included in this Standard but not included under Section 17.1.4a through Section 17.1.4c, are to be replaced or altered, then the requirements of the specific sections in this Standard shall be followed.

17.1.5 When remodeling is carried out in phases, the completed remodeling square footage shall be used to calculate the requirements of this standard, irrespective of the number of phases needed to complete the remodeling.

17.1.6 Doors which open into hazardous areas horizontal fire exits or fire stairs shall have knurled or textured openers, see Section 12.2.3, Emergency Warning Signals and Alarms.

17.1.7 When changes of occupancy (classification) occur to an existing building or facility, it shall be made accessible to handicapped people, even though other remodeling or renovation may not take place. Table 17.1.3 shall be followed for the minimum requirements.

18 HISTORIC PRESERVATION AND HISTORIC RECONSTRUCTION

18.1 Historic preservation and historic reconstruction projects shall be made at least basically accessible to afford disabled persons the opportunity of experiencing their cultural heritage.

18.1.1 Historic preservation and reconstruction projects that will be open to the public shall meet the following requirements.

a. At least one accessible path of travel from a site access point to an accessible entrance shall be provided.

b. At least one accessible entrance whichis used by the public, but shall not be an entrance used exclusively for servicing the building, shall be provided.

c. At least one accessible toilet for each sex, if toilets are provided for visitors use, contiguous to an accessible path of travel shall be provided.

d. Accessible paths of travel from an accessible entrance to all publicly used spaces at least on the level of accessible entrances shall be provided.

e. Accessible parking spaces shall be provided, if parking is provided, and an accessible path of travel from such parking spaces to an accessible entrance shall be available.

f. Displays and written information documents, etc. shall be located where they can be seen by a seated person. Exhibits and signage displayed horizontally e.g., books, shall be no longer than 3'-8" from the floor surface.

g. Where written descriptive information is provided on the contents or layout of the exhibit area, braille and/or audible equivalents should be provided.